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210684

FINAL MAIN SITE RISK ASSESSMENT

for the

**ENGINEERING EVALUATION AND COST ANALYSIS
OF THE FORMER CELOTEX SITE
2800 South Sacramento Avenue
Chicago, Illinois 60623**

Prepared for:

**ALLIEDSIGNAL, INC.
MORRISTOWN, NEW JERSEY
and
THE CELOTEX CORPORATION
TAMPA, FLORIDA**

OCTOBER 1998

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Parsons ES Project No. 730577

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INTRODUCTION

A human health risk assessment (HHRA) was prepared by Parsons Engineering Science, Inc. (Parsons ES) on behalf of the Participating Respondents—AlliedSignal, Inc. and The Celotex Corporation—for the property located at 2800 South Sacramento Avenue in Chicago, Illinois (the Site). The requirement for the HHRA was stipulated in the Administrative Order by Consent, dated November 1, 1996, entered into between the Respondents and the United States Environmental Protection Agency (USEPA).

BACKGROUND

The HHRA was prepared using data presented in the *Data Report for the Engineering Evaluation and Cost Analysis of the Former Celotex Site,* (Parsons ES, 1997). Although the Site has been resurfaced and recontoured following the collection of the data presented in the Data Report, the HHRA was performed based on Site conditions as they originally existed prior to the resurfacing/recontouring (i.e., as they existed during the period of data collection). This approach was taken at the direction of the USEPA Region V Remedial Project Manager.

OVERVIEW OF APPROACH

Potential exposure of both current and future human receptors to surface soil (0-0.5 ft) and mixed surface and subsurface soil (0-10 ft and 0-20 ft) was quantitatively evaluated in the HHRA. Three soil intervals were chosen to evaluate the following exposure scenarios:

- **Zero- to 0.5-foot interval (0-0.5 ft)**: This interval is indicative of surface soil and was used to evaluate exposure of both current and future receptors. Current receptors at the Site include residential trespassers and workers, and future receptors include commercial/industrial workers, construction workers, residential trespassers, residents (adult and child), and recreators (adult and child). These receptors were evaluated for exposure to soils via ingestion, dermal contact, and inhalation of dust and vapors generated from soil.
- **Zero- to 10-foot interval (0-10 ft)**: This interval is indicative of the mixture of surface and subsurface soil that would result following development of the Site as a commercial or industrial facility, a public park, or a residential neighborhood.

The depth of 10 feet is considered to be appropriate for the installation of a standard basement or foundation footings for a standard industrial or commercial building. Future receptors that may be exposed to the mixed soils (0-10 ft) include commercial/industrial workers, construction workers, residential trespassers, residents (adult and child), and recreators (adult and child). These receptors were evaluated for exposure to soils via ingestion, dermal contact, and inhalation of dust and vapors generated from soil.

- **Zero- to 20-foot interval (0-20 ft)**: This interval is indicative of the mixture of surface and subsurface soil that would result following development of the Site where more extensive excavation, such as for an underground parking garage, would be required. Given that this exposure scenario is highly unlikely, a construction worker was the only receptor evaluated for this soil interval. This receptor was evaluated for exposure to soils via ingestion, dermal contact, and inhalation of dust and vapors generated from soil.

All of the above scenarios were evaluated using an exposure point concentration (EPC) derived using USEPA guidance, which states that the lesser of the 95% upper confidence limit (UCL) on the arithmetic mean and the maximum detected concentration (MDC) be identified as the EPC and used in the quantitative HHRA (herein termed the 95% UCL method). The EPC derived in this fashion is intended to provide an upper-bound estimate of mean (or average) exposure to chemical constituents at the Site. In addition, all of the receptors identified for the 0-10 ft interval were also evaluated using the MDC as the EPC (herein termed the MDC method). This evaluation was completed to assess exposure of receptors to a hypothetical "worse case" exposure.

Constituents detected in soil at the site were screened using USEPA Region V (USEPA, 1998a) methodology to identify constituents of potential concern (COPCs) in soil. The COPCs were quantitatively evaluated in the HHRA and constituents of concern (COCs) were identified, as appropriate. COCs are defined as constituents that contribute significantly (individual cancer risk of 1×10^{-6} or hazard quotient of 0.1) to a receptor with a total cumulative lifetime cancer risk of 1×10^{-4} or greater, or a hazard index of 1.0 or greater. Remedial goal options (RGOs) were then derived for the COCs to be used as potential cleanup goals for remedial action. A range of cleanup levels (1×10^{-4} to 1×10^{-6} for cancer and 0.1 to 3 for noncancer) was developed to assist in the evaluation of potential remedial alternatives at a site.

SUMMARY OF FINDINGS

For the Site, COCs were not identified for any receptors exposed to soils in the 0-20 ft interval. COCs were identified for the hypothetical resident exposed to soils in the 0-0.5 ft interval and for the future industrial worker, the hypothetical resident, and the hypothetical recreator exposed to soils in the 0-10 ft interval. RGOs were derived for the COCs in the 0-0.5 ft and 0-10 ft intervals identified during the risk assessment process. The RGOs identified in the 0-0.5 ft and 0-10 ft intervals are as follows:

- Carcinogenic and noncarcinogenic polynuclear aromatic hydrocarbons (PAHs)
- Aroclor-1254 (0-10 ft only)
- Arsenic
- Benzene (0-10 ft only)

An uncertainty analysis was completed that evaluated the appropriateness of the COCs identified at the Site. Based on the uncertainty analysis, only the PAHs are recommended as final COCs at the Site. The other COCs identified in the 0-0.5 ft and 0-10 ft intervals (Aroclor-1254, arsenic, benzene) are not recommended as final COCs for the Site based on magnitude of hazard/risk associated with exposure and the fact that the on-site concentrations of arsenic may be indicative of natural background concentrations.

The residential risk assessment report for the Site EE/CA entitled the "*Deterministic and Probabilistic Calculations to Estimate Risk-Based Cleanup Goals for Soils at Residences Near the 2800 South Sacramento Site, Chicago, Illinois,*" *25 October 1996*, prepared by the Alceon Corporation, selected the 1 x 10^{-4} risk level for the residential area adjacent to the Site. The 1 x 10^{-4} risk level is also recommended for the Site.

SECTION 1
INTRODUCTION

1.1 PROJECT OVERVIEW

On 1 November 1996, the United States Environmental Protection Agency (USEPA) entered into an Administrative Order by Consent (AOC) with the Participating Respondents—AlliedSignal, Inc. and The Celotex Corporation—for the property located at 2800 South Sacramento Avenue in Chicago, Illinois (the Site). The AOC stipulates that an Engineering Evaluation and Cost Analysis (EE/CA) would be performed be for the Site. Included as a part of the AOC was the EE/CA Scope of Work (SOW), which outlined the project-specific activities that were required for the completion of the EE/CA.

Parsons Engineering Science, Inc. (Parsons ES) has been retained by the Respondents, through a contract with AlliedSignal, Inc., to provide the engineering services necessary to complete the EE/CA for the Site. Section IV of the EE/CA SOW stipulates that a risk assessment be conducted for the Site following the *USEPA Risk Assessment Guidance for Superfund* (USEPA, 1989) methodology. This document presents the human health risk assessment (HHRA) that was performed for the main site to fulfill the requirements of the AOC. The HHRA was conducted to evaluate potential risk to current and future human receptors.

It is to be noted that for clarification purposes the following terminology will be used as described below:

- "The Site" refers to the 24 acres of property located at 2800 South Sacramento Avenue, of which approximately 18 acres of the property is owned by The Celotex Corporation, and a 6-acre parcel to the south is owned by Palumbo Corporation et al.
- The risk assessment presented herein refers to the Main Site Risk Assessment.
- References to the "main site" or to "on-site" cited herein refer to the area within the boundaries of the Site that encompasses the 24-acre property described previously.
- Potentially impacted residential areas cited herein may also be referred to as "off-site areas."

1.2 REPORT ORGANIZATION

This HHRA report is divided into four main sections, as follows:

- Section 2 provides a brief summary of the site characterization, including a discussion of site location and physical setting, surrounding land use, site history, and site-specific hydrology.
- Section 3 presents a summary of the HHRA methodology and results, including the data evaluation and identification of constituents of potential concern (COPCs), exposure assessment, toxicity assessment, risk characterization and uncertainty evaluation.
- Section 4 presents the summary and conclusions of the HHRA.
- Section 5 presents the derivation of remedial goal options (RGOs) that are proposed for use in determining corrective action.

SECTION 2
SITE CHARACTERIZATION

2.1 GENERAL

The regulatory history, geology, and hydrogeology of the Site are detailed in the *Data Report for the Engineering Evaluation and Cost Analysis (EE/CA) for the Former Celotex Site*, (Parsons ES, 1997). A site location map (Figure 2.1) and sample location map (Figure 2.2) taken from the Data Report are provided herein. Information provided in the Data Report that is pertinent to the risk assessment process is summarized in the following subsections. The detailed presentation of the analytical findings of the main site field investigation program is presented in the Data Report.

2.2 SITE LOCATION AND PHYSICAL SETTING

The Site is located on the western side of Sacramento Avenue between 31st and 27th streets (Figure 2.1). The Site encompasses 24 acres; 18 acres of the property are owned by The Celotex Corporation, and a 6-acre parcel to the south is owned by Palumbo Corporation et al.

In 1997, resurfacing/recontouring work was completed at the Site to address surface water run-off issues, resulting in a complete alteration of site/soil conditions in approximately the upper 6 feet of the Site (and deeper in a few areas). Given that sampling activities were performed prior to the resurfacing/recontouring of the Site, the depth of some of the samples taken during the EE/CA field sampling program (and reported in the Data Report), do not correlate with current Site elevations. Based on direction from USEPA Region V RPM, the risk assessment was completed based on Site conditions as they originally existed prior to the resurfacing/recontouring actions.

2.3 SURROUNDING LAND USE

The Site is situated within a multi-use area that includes residential, commercial, manufacturing, governmental, and industrial establishments. The Cook County Correctional Facility is located across from the Site, on the east side of Sacramento Avenue. Residential property/buildings and the Atkinson, Topeka & Santa Fe railroad line adjoin the Site along the north and west property boundaries. Residential homes are also located across from the north portion of the eastern property boundary (on the east side of Whipple Avenue). The south side of the Site is bounded by the No. 3050 Chicago Fire Department-Bureau of Support Services, and by vacant land owned by the Palumbo Corporation et al. Residential homes are present on the west side of south Albany Avenue along the southwest quadrant of the Site. The Chicago Sanitary and Ship Canal is located approximately 1,500 feet south of the Site.

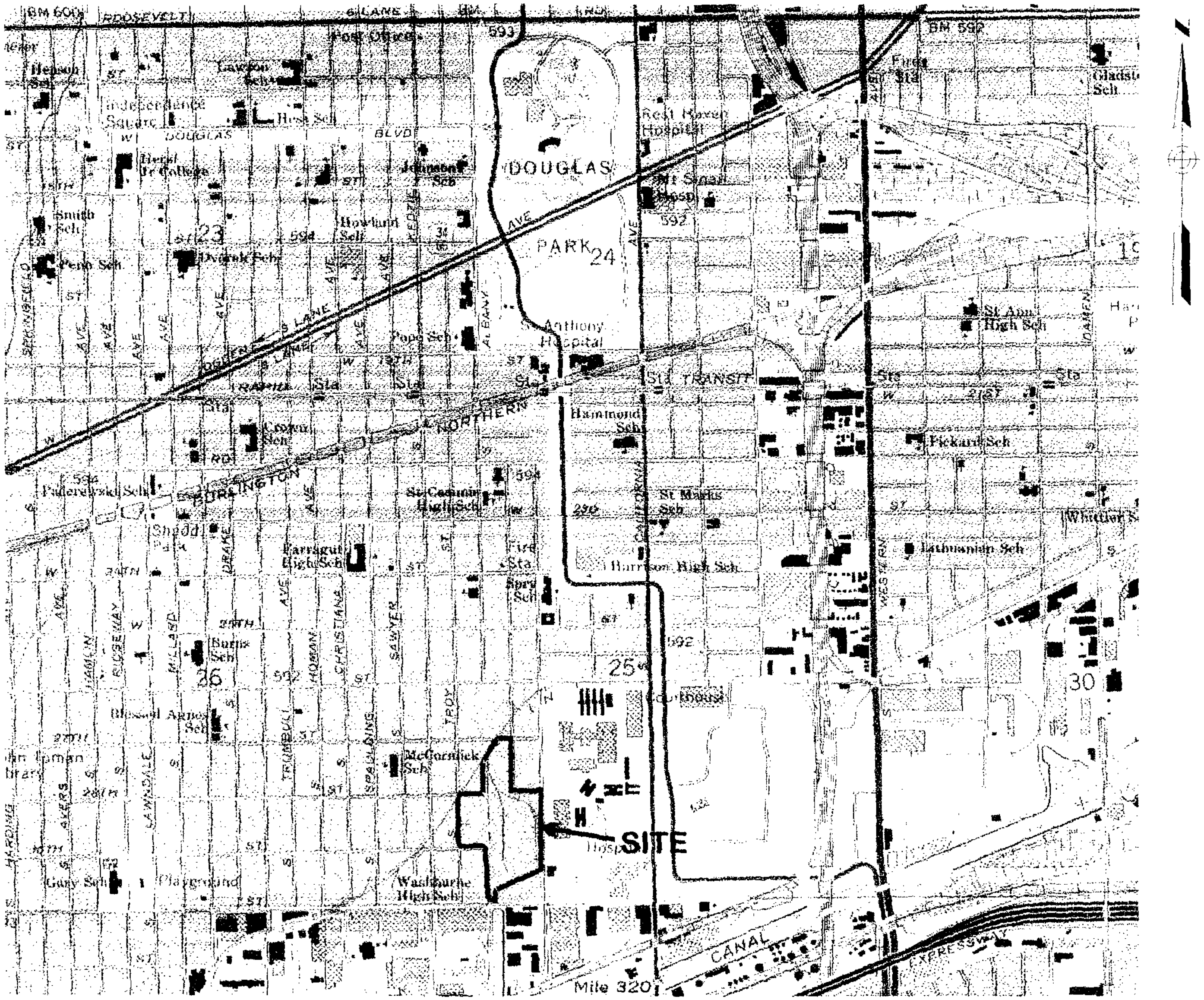
2.4 SITE HISTORY

From 1911 to 1982 the Site operations involved the manufacture, storage, and distribution of asphalt roofing products. The Site formerly housed several manufacturing-related buildings including a large warehouse, smaller storage sheds, an enclosed tank area, and an office building. All buildings have been razed, demolished, and removed from the Site. The only remnants of the manufacturing operation currently visible on site are a few concrete slabs. Areas not overlain by concrete are covered by soil with sparse vegetation (a soil cover was placed over the Site subsequent to the completion of demolition activities). The Site is surrounded by a chain-link fence, and 24-hour security service is present in a trailer located at the main gate entrance from Sacramento Avenue.

2.5 SITE-SPECIFIC HYDROLOGY

As discussed in the Data Report, during drilling activities associated with the main site sampling program, water was only encountered in isolated areas and in minimal quantity. The depth to groundwater was also variable over the entire Site. Groundwater was found to exist in isolated pockets, usually associated with fill materials. Fill and native soils tended to be low permeability clays and silty clays. Porous materials like sand and gravel, tended to be unsaturated. Given these site conditions, it is believed that within a depth of 20 to 25 feet, subsurface water exists only in isolated pockets and not within a continuous flow zone. Attempts to sample Site groundwater within this depth range were hampered by the scarcity of saturated materials beneath the Site. Temporary well points installed as part of the field investigation experienced little or no groundwater accumulation or recharge; therefore, groundwater flow direction could not be defined.

Drinking water in the area of the Site is supplied by the City of Chicago and is obtained from Lake Michigan, located approximately 4.5 miles east of the Site. The City of Chicago has an ordinance in place prohibiting the use of groundwater as a potable source of drinking water. As discussed above, groundwater is not present at the Site and, therefore, is not considered a medium of potential concern. Given the lack of groundwater at the Site, it is not considered further in the HHRA.



VICINITY MAP

SOURCE: 7.5 MINUTE QUADRANGLE MAP OF ENGLEWOOD, IL. DATED 1963, PHOTOREVISED 1972 & 1980.

SITE PLAN

2000 0 2000

SCALE IN FEET

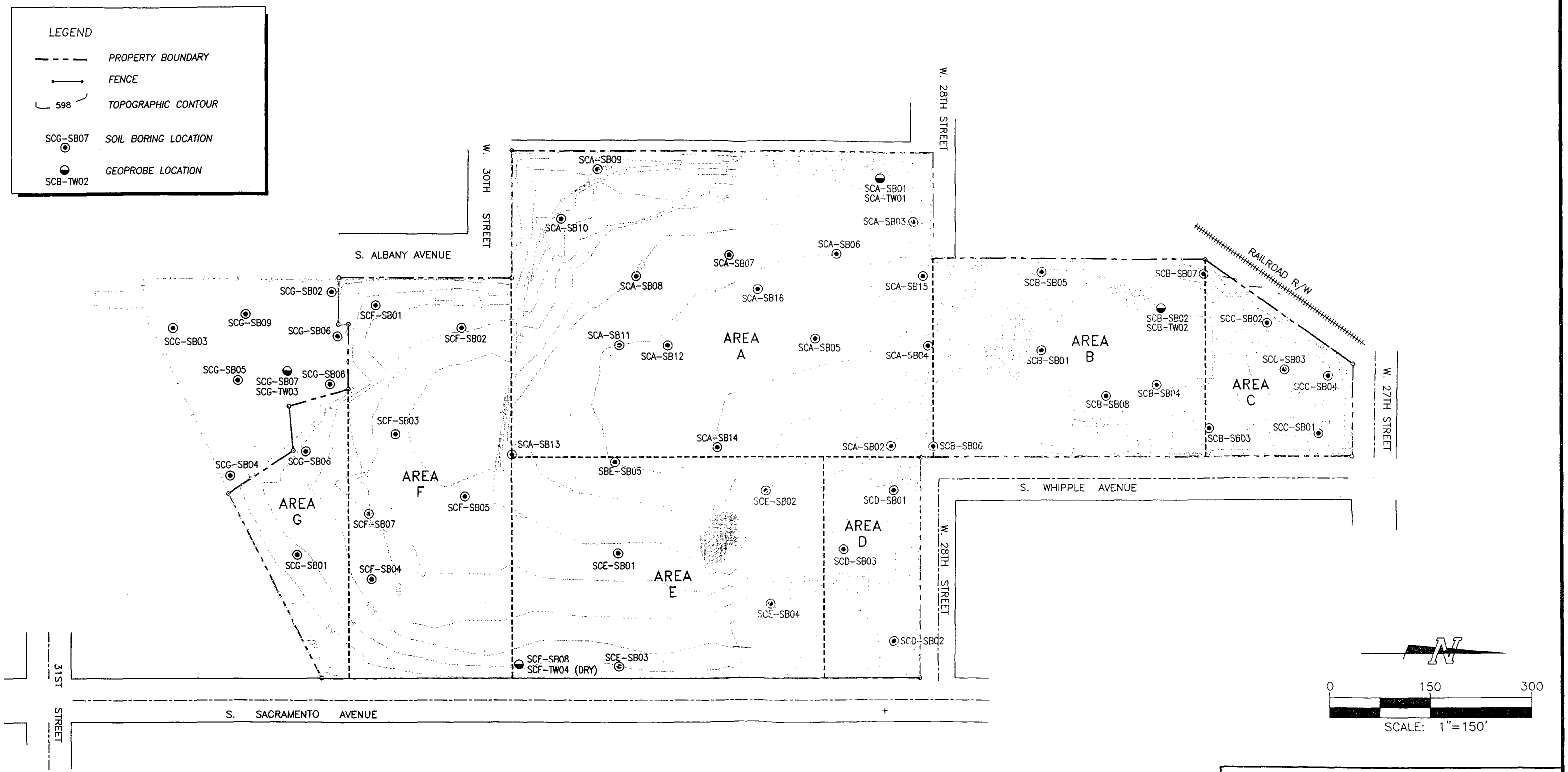
PARSONS ENGINEERING SCIENCE, INC.

SITE LOCATION MAP

AlliedSignal, Inc./The Celotex Corporation

FIGURE 2.1

1-7-98 /site2.cdr



SOURCE: SITE MAP BASED ON FILE No. WAS BASED ON SITE DRAWING PROVIDED BY WESTSHORE ENGINEERING AND SURVEYING, INC. (FILE No. WS-440-11, 5-16-96)

FIGURE 2.2

AlliedSignal, Inc./The Celotex Corporation

SOIL BORING LOCATION MAP

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SECTION 3
HUMAN HEALTH RISK ASSESSMENT

3.1 OVERVIEW

In the AOC, the provisions covering the human health risk assessment include the following language:

"The Respondents shall conduct a risk assessment in accordance with the procedures defined in the 'Risk Assessment for Superfund, Volume 1, Human Health Evaluation Manual,' EPA/540/1-89-002 to assess any risks or potential risks from contamination on the Site or that may have been caused by the Site. For on-site contamination, the risk assessment shall evaluate the risks from future development of the Site. Respondents may propose cleanup objectives and cleanup action levels for each media of concern."

Accordingly, the risk assessment performed for the main site focused on an assessment of the impacts to human health for current and reasonably anticipated future uses of the Site. Since the AOC specifies only an evaluation of human health concerns, and given the highly urban nature of the area in which the Site is situated, an ecological evaluation for the Site was not performed.

The risk assessment process conducted by Parsons ES for the main site consisted of six primary subtasks: (1) data evaluation, (2) exposure assessment, (3) toxicity assessment, (4) risk characterization, (5) uncertainty analysis, and (6) calculation of remedial goals.

3.2 THE HUMAN HEALTH RISK ASSESSMENT PROCESS

A HHRA is performed to provide an estimate of current and future human health risks associated with potentially contaminated sites. The results of the HHRA are used to establish cleanup goals for remedial actions, if required. COPCs identified in this human health screening are evaluated in accordance with federal USEPA and USEPA Region V risk assessment guidance for the evaluation of potential human health effects from site related media (USEPA, 1989; USEPA, 1998a). The HHRA process includes the following major steps:

- Site Characterization (Section 2)
- Data Evaluation and Identification of COPCs (Subsection 3.3)
- Exposure Assessment (Subsection 3.4)
- Toxicity Assessment (Subsection 3.5)
- Risk Characterization (Subsection 3.6)

These steps are discussed in this section with the exception of the site characterization, which is discussed in Section 2. Potential sources of chemical constituents, exposure pathways, and receptors for the Site are described in the conceptual site model (CSM) presented on Figure 3.1.

The CSM provides an overall assessment of the primary and secondary sources of contamination at a site and the corresponding release mechanisms and impacted media. The CSM also identifies potential receptors and associated pathways of exposure to impacted media.

The primary source of chemical constituents at the Site is the result of past Site activities involving the manufacture, storage, and distribution of asphalt roofing products. The primary release mechanism for the chemical constituents was probably deposition onto surface soil, and infiltration and percolation through the soil into the subsurface soil. The primary on-site media impacted by the Site activities, therefore, are surface and subsurface soil. Under various end-use scenarios, chemical constituents may migrate from surface soil to subsurface soil via infiltration and percolation, and/or chemical constituents in subsurface soil may be excavated and redistributed onto the surface to become mixed with surface soil.

The potential secondary release mechanisms from soil include the generation of fugitive dust and the volatilization of chemical constituents from soil, resulting in air (dust and vapors) being considered a secondarily impacted medium. Exposure routes identified for exposure to Site chemical constituents include inhalation of chemical constituents in air (dust and vapors) as well as direct contact via ingestion and dermal contact.

Both current and future receptors are evaluated for potential exposure to Site soils in the HHRA. Current receptors include current workers (i.e., security guards) and residential trespassers; potential future receptors include commercial/industrial workers, residential trespassers, construction workers, on-site recreators, and on-site residents. A detailed discussion of the current and future receptors is provided in Section 3.4.1.

3.3 DATA EVALUATION AND IDENTIFICATION OF COPCS

3.3.1 Data Evaluation

The following media are addressed in the HHRA for the Site: (1) surface soil and (2) mixed surface and subsurface soil. After combining analytical data and eliminating those analytes not detected in any samples in a particular medium, the analytical data were evaluated on the basis of quality, with respect to sample quantitation limits, laboratory qualifiers and codes, and blanks. Data selected for use in the evaluation included unqualified data and those data with qualifiers that indicated uncertainties in concentrations, but not in constituent identification ("J") values. Analytical data with an "R" (rejected) qualifier were not retained for use in the evaluation. Also not selected were data with qualifiers indicating that the analyte was detected in a laboratory blank at a level below the 10-times or 5-times rule for organics (for common laboratory contaminants and other compounds, respectively) or below the 5-times rule for pesticides and inorganics (USEPA 1989). A complete discussion of the data sampling and analysis program is provided in the Data Report. The sample location map resulting from the sampling effort is provided on Figure 2.2. A statistical summary of the on-site soil data evaluated in the HHRA is provided in Appendix A.

The USEPA Region V defines surface soil as those soils which are present at a depth of 0-0.5 ft. The surface soil interval is used to evaluate both current and potential future Site receptors. In addition, potential future receptors are evaluated for exposure to a mixed surface and subsurface soil interval. The choice of interval was based on the assumption that Site development could result in the excavation and redistribution of subsurface soils onto the surface, resulting in surface soil strata which is a mixture of current surface and subsurface soils. For future receptors, depths of 0-0.5 ft, 0-10 ft, and 0-20 ft are assessed, depending on the potential future land use at the Site. Further discussion of the rationale used to evaluate the three depth intervals is provided in Section 3.4.3.

Three background soil samples were collected as part of the Site investigation. Data from these background samples were not used in the constituent screening process described in Subsection 3.3.2, but instead were used qualitatively in the uncertainty analysis (Subsection 3.7).

3.3.2 Constituent Screening

For those chemical constituents detected in Site media, site-specific screening was performed using Region V screening methodology (USEPA, 1998a). Chemicals present in Site samples were compiled for each medium of concern and were screened using USEPA Region V protocol to identify COPCs. The results of the screening (described below) are presented in Appendix B, and a summary of the COPCs identified for each interval is provided in Table 3.1.

For the human health evaluation, constituents identified in the three soil intervals were screened against risk-based concentrations and the frequency of detection. An essential nutrient screening was not completed for the Site since essential nutrients (e.g., calcium, potassium, and sodium) were not considered to be potential sources of chemical constituents at the Site and were not included in the Site sampling and analysis program.

The human health screening hierarchy approved by USEPA Region V (USEPA, 1998a) was used to identify the COPCs to be evaluated in the risk assessment. The USEPA Region V screening process is as follows:

1. **Risk-Based Screening:** A comparison of maximum on-site concentrations to available human health criteria was completed as the first step in the screening process. For closely related chemicals (structure and mode of toxicity), screening criteria for surrogate chemicals were used, where appropriate. USEPA Region III Risk-Based Concentrations (RBCs) for residential soil (USEPA 1998b) were compared to the MDC of each analyte in each soil interval. RBCs based on a cancer risk level of 1×10^{-6} were used for carcinogens and RBCs based on a Hazard Quotient (HQ) of 0.1 were used for noncarcinogens.

2. **Frequency of Detection Screening:** COPCs identified from the RBC screening that were present at a frequency of detection of 5% or less were dropped from consideration as COPCs (USEPA 1989, 1998a). A minimum of 20 samples is needed for completion of this screening step.
3. **Identification of COPCs**: Analytes not eliminated using the screening process are considered COPCs and are quantitatively evaluated in the HHRA. Also, all members of a chemical class were retained if some of the members exceeded the screening process (e.g., PAHs).

3.4 EXPOSURE ASSESSMENT

The objective of the exposure assessment is to estimate the type and magnitude of potential exposures to the COPCs identified following the methodology discussed in Section 3.3.2. An exposure pathway is considered complete only when all of the following four elements is present:

- A contaminant source
- A mechanism for release, retention, or transport of a chemical in a given medium
- A point of human contact with the medium (i.e., exposure point)
- A plausible receptor and route of exposure at the exposure point

A CSM has been developed to identify the source of chemical constituents and the potential receptors and pathways of exposure relating to the Site (Figure 3.1).

Consistent with USEPA's Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989), current and reasonably foreseeable future land-use scenarios are considered for the Site.

Current land use at the Site is industrial/commercial. A portion of the Site is currently covered with concrete, although the majority of the Site is covered by soil with sparse vegetation. All current surface soils (0-0.5 ft) are used to assess potential exposure of both current and potential future receptors. It should be noted that although some surface soil samples were collected from beneath concrete, all surface soil samples were pooled as part of a conservative evaluation for potential impacts to current receptors (i.e., workers and adolescent trespassers).

Potential land-use scenarios at the Site include industrial/commercial, recreational (e.g., a public park) or residential. Given the history of the area, these land-use scenarios are appropriate. Mixed surface and subsurface soils are evaluated for future receptors to account for potential excavation and redistribution of soils during the "hypothetical" future redevelopment of the Site. As discussed above, groundwater is not present at the Site and, therefore, is not considered in the HHRA.

3.4.1 Potential Receptors

The following potential receptors are identified for the Site.

3.4.1.1 Current Residential Trespassers

Although the Site is fenced and 24-hour security is present at the main gate, it is possible that nearby residents may trespass onto the Site and be exposed to Site surface soils. The trespasser is assumed to be an adolescent. Such an individual may be exposed to surface soils at the Site, with potentially complete exposure pathways including incidental ingestion, dermal contact, inhalation of fugitive dust, and inhalation of volatiles from soil.

3.4.1.2 Current/Future Commercial/Industrial Workers

Current workers and future commercial/industrial workers are defined as individuals that are employed at or near the Site and have unlimited access to Site media. Currently, on-site workers are security personnel assigned to the property. In the future, workers may be employed at an industrial or commercial facility that may be present on Site. Both the current and future workers are assumed to be potentially exposed daily (5-day work week) to Site media.

Current workers are assumed to be exposed to surface soil (0-0.5 ft in depth). However, future workers are considered to be exposed to both surface soil (0-0.5 ft) and mixed surface and subsurface soil (0-10 ft). Mixed surface and subsurface soil is defined as surface soil that is a mixture of surface and subsurface soils, given natural erosion effects and potential excavation. Incidental ingestion of soil, dermal contact with soil, inhalation of fugitive dust from soil, and inhalation of volatiles from soil are potential pathways for exposure to soil.

3.4.1.3 Hypothetical Future Construction Workers

In addition to the commercial/industrial workers described above, construction workers may also be exposed to Site soils in the future. The difference between commercial/industrial workers and construction workers is that construction workers have the potential to be more highly exposed than commercial/industrial workers, but over a shorter period of time (i.e., the duration of the construction activity).

Three scenarios are assessed for the future construction worker at the Site: exposure to soils at a depth of 0-0.5 ft, 0-10 ft, or at a depth of 0-20 ft. Exposure to soils at a depth of 0-0.5 ft is expected when construction occurs at the surface and excavation activities are not required. Exposure to soils at a depth of 0-10 ft is expected when standard commercial/industrial or residential development of the Site occurs. A depth of 10 feet is considered to be reasonable for a residential basement or for footings for an industrial building. Exposure to a depth of 0-20 ft, however, is expected if more extensive excavation of the Site is required for purposes such as installation of an underground parking garage.

The installation of a structure requiring a 20-ft excavation is considered highly unlikely. As such, the construction worker is the only receptor that is evaluated for potential exposure to the 0-20 ft interval. However, the derived risks associated with exposure of the construction worker to the 0-20 ft mixed soil provide an indication of potential risk associated with this soil interval.

3.4.1.4 Hypothetical Future Recreators (Adult and Child)

Should the Site become a public park in the future, recreators may be exposed to Site soils. Hypothetical future recreators (child and adult) are assumed to be exposed to surface soil (0-0.5 ft) or mixed surface soil (0-10 ft) as a result of Site development. Mixed soil is defined as surface soil that is a mixture of surface and subsurface soils, given natural erosion effects and potential excavation. Incidental ingestion of soil, dermal contact with soil, inhalation of fugitive dust from soil, and inhalation of volatiles from soil are potential pathways for exposure to surface and mixed surface and subsurface soils.

3.4.1.5 Hypothetical Future Residents (Adult and Child)

Hypothetical future residents are defined as individuals that reside on site and have unlimited access to Site media. The residents are assumed to be exposed to Site media on a daily basis. Both an adult and child resident are considered in the HHRA.

Hypothetical future residents are assumed to be exposed to surface soil (0-0.5 ft) or mixed surface soil (0-10 ft). Mixed soil is defined as surface soil that is a mixture of surface and subsurface soils, given natural erosion effects and potential excavation. Incidental ingestion of soil, dermal contact with soil, inhalation of fugitive dust from soil, and inhalation of volatiles from soil are potential pathways for exposure to surface, mixed surface, and subsurface soils.

3.4.1.6 Future Residential Trespassers

In the future, it is possible that the Site will be a commercial/industrial facility with residential neighborhoods in the surrounding area. It is therefore possible that nearby adolescent residents may trespass onto the Site in the future. This receptor will be exposed to mixed surface and subsurface soils at the Site, with exposure pathways including incidental ingestion, dermal contact, inhalation of fugitive dust, and inhalation of volatiles from soil.

3.4.2 Estimation of Intake

Two types of exposure estimates are currently used for CERCLA-type risk assessments: reasonable maximum exposure (RME) and central tendency (CT). The RME is defined as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site, and is intended to account for both uncertainty in the contaminant concentration and variability in the exposure parameters (such as exposure frequency or averaging time). The CT, which is meant to characterize a more average exposure, is evaluated for comparison purposes and is based on mean exposure parameters.

The following general equation will be used to quantify exposure to potential receptors:

$$\text{Intake} = \frac{C * CR * EF * ED}{BW * AT}$$

Where:

C = Chemical Concentration in Soil (mg/kg)
CR = Contact Rate (amount/unit time: mg/d soil)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (days: equal to ED for noncarcinogen(s) and 70 years for carcinogens)

Details of the exposure assumptions and parameters that are used to evaluate exposure in the HHRA are listed in Table 3.2. The site-specific particulate emission factor (PEF) and volatilization factors (VFs) used for each chemical in the soil inhalation exposure scenario are provided in Appendix C.1 (USEPA, 1996a). The primary sources for the RME and CT exposure factors are as follows:

- USEPA 1989: RAGs for Superfund, Volume I (RAGS)
- USEPA 1991a: Supplemental Guidance, Standard Default Exposure Factors
- USEPA 1992a: Dermal Exposure Assessment, Principles and Applications
- USEPA 1993a: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA 1995a: Supplemental Guidance to RAGS: Region 4 Bulletins. Human Health Risk Assessment
- USEPA 1997. Exposure Factors Handbook

These referenced sources are used to calculate pathway-specific intake factors for all potential pathways at the Site.

As detailed in Table 3.2, most of the exposure assumptions used in the HHRA are default values from the above sources. The site-specific exposure assumptions used in the HHRA are discussed below:

1. Current/Future Adolescent Trespasser

   - Exposure frequency of 50 days/year (RME) reflects exposure 1 day/week for 50 weeks (2 weeks away from home for vacation). The CT exposure frequency of 25 days/year reflects exposure 1 day/2 weeks for 50 weeks. The exposure duration for both the RME and CT evaluations is 10 years.
   - Skin surface area of 4,400 cm^2 (RME) and 3,350 cm^2 (CT) reflects 25% of total body surface area for a 13-year-old adolescent. USEPA (1992a) recommends that, for soil contact scenarios, a value of 25% is appropriate to represent exposure of the hands, legs, arms, neck and head.
   - The assumed exposure time for the inhalation pathway is 4 hours for the RME scenario and 2 hours for the CT scenario and the body weight of the adolescent receptor is assumed to be 45 kg. It is assumed that 50% of the soil that the receptor is exposed to originates from the contaminated source.

2. Future Adult and Child Recreator

   - Exposure frequency of 100 days/year (RME) reflects exposure 2 days/week for 50 weeks (2 weeks away from home for vacation). The CT exposure frequency of 50 days/year reflects exposure 1 day/week for 50 weeks. The exposure duration is a total of 30 years for the RME evaluation (6 years as a child and 24 years as an adult) and 9 years for the CT evaluation (6 years as a child and 3 years as an adult).
   - Skin surface area of 5,800 cm^2 (RME) and 5,000 cm^2 (CT) for the adult and 2,300 cm^2 (RME) and 1,980 cm^2 (CT) for the child (6-year-old child) reflects 25% of total body surface area for these receptors.
   - The assumed exposure time for the inhalation pathway is 4 hours for the RME scenario and 2 hours for the CT scenario and the body weight of the receptors are assumed to be 70 kg for the adult and 15 kg for the child. It is assumed that 50% of the soil that the receptor is exposed to originates from the contaminated source.

3. Future Adult and Child Resident

   - Exposure frequency of 350 days/year (RME) reflects exposure 7 days/week for 50 weeks (2 weeks away from home for vacation). The CT exposure frequency of 250 days/year reflects exposure 5 days/week for 50 weeks. The exposure duration is a total of 30 years for the RME evaluation (6 years as a child and 24 years as an adult) and 9 years for the CT evaluation (6 years as a child and 3 years as an adult).

- Skin surface area of 5,800 cm^2 (RME) and 5,000 cm^2 (CT) for the adult and 2,300 cm^2 (RME) and 1,980 cm^2 (CT) for the child (6-year-old child) reflects 25% of total body surface area for these receptors.
- The assumed exposure time for the inhalation pathway is 24 hours for both the RME and CT scenarios. The body weight of the receptors are assumed to be 70 kg for the adult and 15 kg for the child. It is assumed that 50% of the soil the receptor is exposed to originates from the contaminated source.

4. Current/Future Worker

- Exposure frequency of 250 days/year (RME) reflects exposure 5 days/week for 50 weeks (2 weeks away from home for vacation). The CT exposure frequency is 234 days/year (USEPA, 1993a). The exposure duration is a total of 25 years for the RME evaluation and 5 years for the CT evaluation.
- Skin surface area of 5,800 cm^2 (RME) and 5,000 cm^2 (CT) for the adult worker reflects 25% of total body surface area.
- The assumed exposure time for the inhalation pathway is 8 hours for both the RME and CT scenarios. The body weight of the receptor is 70 kg. It is assumed that 50% of the soil the receptor is exposed to originates from the contaminated source.
- An inhalation rate of 1.25 m^3/hr is assumed for the industrial worker. This value assumes that a half of a workers daily inhalation rate of 20 m3/day will occur during the 8-hour workday (10 m3/day ÷ 8 hours/workday).

3.4.3 Exposure Point Concentrations

Exposure point concentrations (EPCs) are the concentrations of chemicals in a given medium to which a hypothetical receptor may be exposed at a specific location known as the "exposure point." Exposure point concentrations can be based on analytical data obtained from on-site sampling, or they may be estimated through modeling. The exposure point concentrations for oral and dermal pathways are equal to the representative site concentrations for media. Exposure point concentrations for exposure to particulates and volatiles generated from soil are modeled based on the most recent methodology provided by USEPA (USEPA, 1996a).

In assessing the possible exposures of hypothetical or actual receptors to Site chemical constituents for a HHRA, an EPC must be calculated for each chemical in each medium. USEPA (1992b) defines two types of exposure estimates currently used for risk assessments: a RME and CT (average) exposure.

Three soil intervals were evaluated for current and potential future receptors at the Site:

- **Zero- to 0.5-ft interval (0-0.5 ft)**: This interval is defined as surface soil and is evaluated for potential exposure by current/future residential trespassers, current/future commercial/industrial workers, future recreators (adult and child combined), future construction workers, and future residents (adult and child combined). The lesser of the 95% UCL (derivation discussed in the following section) and the MDC was used as the EPC for both the RME and CT evaluations. This methodology is herein referred to as the 95% UCL method.

- **Zero- to 10-ft interval (0-10 ft)**: This interval is defined as mixed surface and subsurface soil for a standard future excavation scenario (i.e., building homes or commercial/industrial buildings). A depth of 10 feet is considered to be appropriate for standard development. This interval was evaluated for potential future trespassers, commercial/industrial workers, construction workers, residents (both child and adult) and recreators (both child and adult). Two evaluations were performed for these receptors exposed to this soil interval:

    1. The lesser of the 95% UCL and the maximum detected value was used as the EPC for both the RME and CT evaluations (95% UCL method).

    2. The MDC was used as the EPC for both the RME and CT evaluations (herein referred to as the MDC method). These evaluations were completed to assess exposure of receptors to a hypothetical "worst case" exposure. These analyses are extremely conservative because the MDC of every chemical was assumed to be located in an area in which a receptor would be exposed. The analyses were evaluated to provide an indication of potential risks associated with the worst case exposure at the Site. The results of the MDC evaluation are presented in Appendix D. RGOs derived for potential remedial action were only presented for COCs identified using the 95% UCL method.

- **Zero- to 20-ft interval (0-20 ft)**: This interval is defined as mixed surface and subsurface soil for a potential future deep excavation scenario (i.e., building an underground parking garage). The likelihood of this excavation scenario occurring, however, is very low. The 0-10 ft interval discussed above is a much more likely excavation scenario than the 0-20 ft interval. Therefore, the 0-20 ft interval was evaluated for potential construction workers only to allow for an indicator of this unlikely scenario. The lesser of the 95% UCL and the MDC was used as the EPC for both the RME and CT evaluations (95% UCL method).

A statistical summary of the data used in the risk assessment is provided in Appendix A (Tables A.1-A.3).

3.4.3.1 Derivation of the EPC Term

Validated analytical results for samples collected within the Site boundary were evaluated statistically to yield appropriate concentration terms for input to the risk assessment.

The USEPA recommends the arithmetic mean as the appropriate statistical parameter of the distribution to use as the concentration term, regardless of the distribution that best describes the sample data (EPA, 1992c). The 95% upper confidence limit (UCL) on the arithmetic mean is a reasonable bound on the uncertainty associated with estimating the true, but unknown, population mean. Calculating the 95% UCL of the arithmetic mean for small environmental data sets, however, can be problematic. Two of the most difficult problems in developing the arithmetic mean as an estimator are how to handle values reported as less than some laboratory limit (i.e., "nondetects"), and the influence of outliers in a data set.

The appropriate method for dealing with non-detects (referred to as "censored data") can be different depending on the proportion of non-detects in the data set, the presence of multiple reporting limits, and the locations of non-detects in the statistical distribution. Outliers can also be a problem, because the arithmetic mean can be highly influenced by one or more large values in the data set. The methods used in this analysis were designed to find an upper bound on the true (but unknown) arithmetic mean concentration of each COPC. In some cases, a positive bias (i.e., conservative) was used to ensure the arithmetic mean was bounded.

<u>Statistical Methods</u>

These statistical methods were selected to extend the work presented by the USEPA's Superfund Guidance (USEPA, 1992c), and calculate a 95% UCL when the distribution of the sample data are unknown and should not be assumed to follow a normal or lognormal distribution. Three methods of calculating the UCL were used for these data:

- The common UCL formula based on Student's t-distribution was applied when the data adequately fit a normal distribution (Rice, 1994).

- Land's method (Gilbert 1987, USEPA, 1992c) for the arithmetic mean was used when the data very closely fit a lognormal distribution. Refer to the "Graphical Analysis" discussion in Subsection 3.4.3.2.
- The non-parametric "bootstrap" algorithm (Efron and Tibshirani, 1993; Burmaster and Thompson, 1997) was used to approximate the UCL when the data were not assumed to follow a normal or lognormal distribution.

Bootstrap Method

Non-parametric bootstrap methods assume the data do not follow any known theoretical distribution and that a UCL cannot be reasonably calculated based on any statistic, including the arithmetic mean. In particular, the "percentile" bootstrap method (Efron 1981), recommended for censored data, was used because of high fractions of non-detects in many of the data sets. This method estimates the UCL using Monte Carlo simulation, and has been shown to have good theoretical coverage properties and reasonable stability in practice (Efron and Tibshirani, 1993). The percentile method was applied by randomly sampling the given data set with replacement and calculating the arithmetic mean of the resampled data. Random sampling "with replacement" allows the same value to be selected more than once. This process was repeated 1,000 times to yield 1,000 "bootstrap" means. The 95th percentile of this "distribution" of bootstrap means was then selected as the 95% UCL.

Censored Data

Robust statistical methods were considered when the proportion of non-detects was equal to or greater than 20 percent. Robust methods refer to a family of statistical procedures specifically designed for censored data. A literature review included Gibbons (1994), Gilliom and Helsel (1986), Helsel and Gilliom (1986), Helsel (1990), Helsel and Cohn (1988), Haas and Scheff (1990), and Kushner (1976). A simple substitution method of using one-half the laboratory reporting limit (i.e., SQL) as surrogate values for the nondetect results was selected. Although this method does not appropriately represent the statistical distribution of the non-detect results, it performs adequately for estimating the arithmetic mean and standard deviation under the statistical characteristics of these data. This approach was chosen based on simulation study results for data with multiple reporting limits found by Helsel and Cohn (1988) and Helsel (1990). Its performance in estimating the arithmetic mean was also supported by Kushner (1976).

The use of one-half the SQL with the bootstrap method was selected as a conservative approach for calculating the UCL on the arithmetic mean when the percentage of nondetects was greater than or equal to 50. Gibbons (1994) notes that this simple substitution creates a positive bias (i.e., conservative) when the percentage of non-detects is high. Haas and Scheff (1990) found similar results and showed that this substitution was the only method that was positively biased for normal, heavy-tailed, and lognormally distributed data.

Nondetect results with a SQL greater than the maximum detected result for that data set were excluded. Nondetects with these elevated reporting limits were removed from the data because there is not enough quantitative information in those sample results to contribute to estimating the mean concentration of that data set. This approach is intended to prevent nondetects from determining the EPC and potentially driving the results of the risk assessment.

Calculation of 95% UCL

The decision logic for calculating the 95% UCL for each data set is shown on Figure 3.2. If the sample size was less than or equal to five, the maximum detected value was used as the EPC.

It is to be noted that the methods used to calculate the EPC do not account for the spatial configuration of the data. This simplification is relevant and very important for risk scenarios with an exposure unit (EU) smaller than the entire site itself (in this case a 24-acre site). A more complex analysis using geostatistics could be applied to more fully describe the risk of an exposed population for these risk scenarios. For example, if under a future residential scenario for the Site, the EU was a one-quarter acre parcel, the data from the 52 boreholes could be interpolated onto a fine grid using Kriging, and the associated uncertainty could be estimated. A spatial simulation could then be performed to randomly locate many one-quarter acre parcels on the interpolated grid. The corresponding EPC calculated for each random one-quarter acre parcel would then be used to represent the concentration experienced by an individual of the exposed population. In this particular example, the uncertainty and therefore the EPC would be large due to the application of one-quarter acre resolution across a 24-acre site with 52 boreholes. This type of analysis was beyond the scope of this risk assessment, and would likely require more data to sufficiently reduce the uncertainty to a level that would yield results that are different than those generated by the simplified approach used herein.

As such, given that the risk conceptual site model identifies EUs smaller than the size of the entire site, risk estimates were calculated using the MDC. The risk results based on MDCs represent an upper bound on the possible risk experienced by an exposed population. They show the risk to a receptor if that receptor was to spend his or her entire exposure duration directly on the highest concentration observed on the Site. These are "worst-case" scenarios that have an extremely low likelihood of occurring, and are simply used to provide an upper bound to the risk distribution. Refer to Appendix D for the MDC evaluation.

Should a pre-design sampling program be performed to further delineate location-specific impacts for specific scenarios, the execution of the more complex analysis described previously may be appropriate prior to selecting/implementing a remedial option.

3.4.3.2 EPC Results

Summary statistics were computed and a graphical distribution analysis was performed for each compound-specific data set. If possible, a distribution for each data set was determined and an UCL was calculated. The results of the analysis are shown in Appendix A.

Summary Statistics

Summary statistics were calculated for each data set. They provide estimates of the statistical parameters of the data distribution and information on the influence of nondetect results and outliers on the analyses. In general, the data sets were heavily skewed to the right, sometimes beyond that of a lognormal distribution, and often contained outliers.

Right skewness refers to the asymmetry of the distribution of the data toward the higher concentrations. Outliers are defined as observations that appear to be inconsistent with the remainder of that set of data (Barnett and Lewis, 1994). Outliers in a data set can significantly inflate the estimates of the arithmetic mean and standard deviation, and therefore, often substantially increase the corresponding UCL. The question then becomes: Are the outliers high enough to influence the results of a risk assessment, and if so, is it appropriate to allow a few sample results to discount much of the other data in the analysis (Koehler, 1997). Outliers were allowed to be influential, by selecting the arithmetic mean as the statistical parameter to represent the EPC. This decision was based on Superfund Guidance (USEPA, 1992c) and the risk conceptual model, and is the conservative approach.

The calculated summary statistics provided in Appendix A (Tables A.1, A.2 and A.3) include:

- Number of data points, or statistical samples (n), in the data set
- Number of samples in which the analyte was detected
- Percentage of detections
- SQL range for nondetects (in milligrams per kilogram [mg/kg])
- Minimum detected value (mg/kg)
- Maximum detected value (mg/kg)
- Mean (mg/kg)
- Median (mg/kg)
- Standard deviation (mg/kg)
- EPC (mg/kg) used in the risk assessment

Mean and Median

The mean and the median of each data set were included in the summary statistics. The mean is the classical measure of location of a data set, but is very sensitive to the magnitude of a small number of data points. When this strong influence of a few observations is desirable, the mean is an appropriate measure of the center of the data.

The median is the 50th percentile of the ordered values and is resistant to outlying observations because it is based only on the ranks of the data. The two statistics can be compared for each contaminant to help identify possible outliers and to gauge the skewness of the data set.

Standard Deviation

The standard deviation was also calculated for each data set. The standard deviation is the standard measure of the spread of a data set. It is the square root of the average of the squared deviations of each value from the sample mean. This statistic is even more sensitive to the influence of outliers than the sample mean because of its squared term.

Graphical Analysis

Four types of graphs were used to evaluate distributions of the data: histograms, density-estimation plots, boxplots, and probability (Q-Q) plots. Plots of the log-transformed data for each data set are presented in Appendix A. Tables A.1, A.2, and A.3 shows the distributional assumption for each data set and the corresponding EPC.

Histograms are used to display the general shape of the data distribution. The density-estimation plot is another estimate of the probability density function that uses a simulation technique. The boxplot is a nonparametric plot of the distribution. Boxplots show several important aspects of the empirical distribution including location, spread, skewness, tail length, and outlying data points (Hoaglin et al., 1983). It consists of a center line for the median (50th percentile) crossing the interior of a rectangle defined by the 25th and 75th percentiles of the data set. "Whiskers" are drawn extending outside the box to show the tails of the distribution. Potential outliers are plotted as points beyond the whiskers. The Q-Q plot displays the quantiles (percentiles divided by 100) of the sample data against the quantiles of a standard normal distribution. This is an excellent method for assessing whether the data are normally or lognormally distributed. The extent, pattern, and locations of nondetects can be visually assessed. In these plots, the diagonal line indicates a perfect fit and the "+" symbol indicates a nondetect result.

3.5 TOXICITY ASSESSMENT

The objective of the toxicity assessment is to weigh available evidence regarding the potential for particular chemical constituents to cause adverse effects in exposed individuals and to provide, where possible, an estimate of the relationship between the extent of exposure to a contaminant and the increased likelihood and/or severity of adverse effects.

The most recent available toxicity data was used to calculate carcinogenic and noncarcinogenic risks. This includes the Integrated Risk Information System (IRIS; USEPA, 1998c) updates and Health Effects Assessment Summary Tables (HEAST; USEPA, 1995b). In addition, provisional and surrogate toxicity factors are included in the assessment where available and appropriate. Toxicity values used in the risk assessment are provided in Table 3.3.

To assess toxicity via the dermal absorption route of intake, intake resulting in absorbed dose is compared to a toxicity value representing absorbed dose. To convert intake from administered to absorbed dose, the intake factor is adjusted by a dermal absorption factor (1% for organics and 0.1% for inorganics). To convert administered dose toxicity factors (oral) to absorbed dose toxicity factors, the oral toxicity factors are adjusted by oral absorption factors. Oral absorption efficiencies (percent absorbed by the gastrointestinal tract following oral intake) were identified for each COPC and are used to modify toxicity values as follows:

- For carcinogens, the oral slope factor is divided by the oral absorption efficiency to derive an adjusted slope factor.
- For noncarcinogens, the oral reference dose is multiplied by the oral absorption efficiency to derive an adjusted reference dose.

If an appropriate oral absorption efficiency value was not identified, the following default values were used: 80 percent for VOCs, 50 percent for SVOCs, and 20 percent for inorganics (USEPA 1995a). Administered dose toxicity values are used for oral and inhalation routes of toxicity.

For the evaluation of carcinogenic PAHs, USEPA guidance (USEPA, 1993b) was consulted for toxicity equivalency factors (TEFs) based on the toxicity of benzo(a)pyrene. Those COPCs that are not quantitatively addressed in the HHRA are qualitatively addressed in the uncertainty section.

Lead was detected in soil at the Site at concentrations exceeding the USEPA target value of 400 mg/kg (USEPA, 1994a) and was assessed using the *USEPA's Integrated Exposure Uptake Biokinetic Model for Children* (IEUBK) (Version 0.99d; USEPA, 1994b) for residential receptors and *Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil* (USEPA, 1996b) for non-residential receptors. The IEUBK model provides an assessment of potential impacts of soil and other environmental media (i.e., groundwater, lead-based paint) on a residential child receptor. The nonresidential model provides an assessment of nonresidential exposure by relating soil lead intake to blood lead concentrations in women of child-bearing age. The methodology focuses on estimating fetal blood lead levels in women exposed to Site soils.

Appendix E provides toxicity profiles for the COCs identified at the Site. The toxicity profiles discuss the physical and chemical properties, fate and transport, and toxicity associated with each COC.

3.5.1 Noncarcinogens

For many noncarcinogenic toxicity effects, protective mechanisms may exist that must be overcome before an adverse effect is manifested. As a result, a range of exposures, from zero to some finite threshold value, may be tolerated by an organism without any expression of adverse effects. In developing toxicity values to evaluate noncarcinogenic effects, the USEPA approach is to identify the upper bound of this tolerance range (i.e., the maximum subthreshold level). For most chemicals, this level can only be estimated, so uncertainty factors and modifying factors are applied to this estimated level to derive a reference dose (RfD) for evaluation of noncarcinogens (USEPA, 1989).

An RfD reported as an intake (in mg/kg per day) is the toxicity value used most often in evaluating noncarcinogenic effects. Reference concentrations (RfCs), reported as a concentration in air (in mg/m^3), are used to evaluate noncarcinogenic effects via the inhalation route.

RfDs are developed and verified by USEPA and are defined as "an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime" (USEPA, 1989). RfDs are usually based on the highest concentration of a chemical tested at which no adverse effects were demonstrated in animal experiments (the NOAEL, or no observed adverse effect level). Occasionally, RfDs are based on human epidemiological data, most often from occupational health studies. To calculate an RfD, the NOAEL is divided by uncertainty and modifying factors. If a NOAEL is not available for a chemical, a LOAEL (lowest observed adverse effect level) may be divided by additional factors for use as an RfD (USEPA, 1989).

RfDs/RfCs are reported with their associated uncertainty factors (UFs). UFs generally consist of multiples of 10, with each factor representing a specific area of uncertainty inherent in the extrapolation from available data. The use of UFs helps to ensure that the potential for adverse noncarcinogenic effects is not underestimated, even for sensitive subpopulations, during the derivation of RfDs/RfCs.

3.5.2 Carcinogens

For human health risk assessment, USEPA subscribes to the "nonthreshold" theory of carcinogenesis, which proposes that there is essentially no level of exposure to a carcinogen that does not pose a finite probability of generating a carcinogenic response. This theory assumes that a small number of molecular events can evoke changes in a single cell that may lead to uncontrolled cellular proliferation and eventually to cancer (USEPA, 1989). Therefore, no dose is thought to be risk free and, in evaluating cancer risk, an effect threshold cannot be estimated. As a result, USEPA takes a probabilistic approach to the evaluation of the carcinogenicity of chemicals. This two-step evaluation includes the assignment of a weight-of-evidence classification to each chemical based on: (1) strength of evidence that it is a human carcinogen; and (2) calculation of a slope factor for those chemicals that are possible, probable, or known human carcinogens (USEPA, 1989).

The USEPA weight-of-evidence classification system characterizes a chemical's carcinogenicity based on the availability of animal, human, and other supportive data. A chemical is assigned to one of the following classes, based on the strength of evidence that a chemical produces carcinogenic effects in humans (USEPA, 1989):

- Group A -Human Carcinogen. This category indicates that there is sufficient evidence from epidemiological studies to demonstrate carcinogenicity in humans.
- Group B - Probable Human Carcinogen. This category is subdivided into Group B1 and Group B2:
  - Group B1 indicates limited data are available suggesting carcinogenicity in humans.
  - Group B2 indicates there is sufficient evidence of carcinogenicity in animals and inadequate or no evidence in humans.
- Group C - Possible Human Carcinogen. This category indicates that there is limited evidence of carcinogenicity in animals and inadequate or no evidence in humans.
- Group D - Not Classifiable. This category indicates that there is inadequate or no data by which to classify a chemical as a human carcinogen.
- Group E - Evidence of Human Noncarcinogenicity. This category indicates there is no evidence of carcinogenicity in an adequate number of studies.

The slope factor (SF) is a plausible upper-bound estimate of the probability of a carcinogenic response per unit intake of a chemical over a lifetime. It is usually the 95% UCL of the slope of the dose-response curve and is expressed as the reciprocal of the chemical intake (in mg) per kg of body weight per day [(mg/kg-bw-day)$^{-1}$] or [kg-bw-day/mg]. The SF is used in risk assessments to estimate an upper-bound lifetime probability of an individual developing cancer as a result of exposure to a particular level of a potential carcinogen. SFs are accompanied by the weight-of-evidence classification to indicate the strength of the evidence that the chemical is a human carcinogen (USEPA, 1989).

SFs are reported either as "risk per unit dose" [(mg/kg-day)$^{-1}$] or as a "unit risk." Unit risk expresses risk from a substance per concentration of that substance in the medium where human contact occurs. For example, inhalation SFs are usually reported as risk per unit concentration in air [$(\mu g/m^3)^{-1}$].

3.6 RISK CHARACTERIZATION

To characterize potential noncarcinogenic effects, comparisons are made between projected intakes of substances and toxicity values. To characterize potential carcinogenic effects, probabilities that an individual will develop cancer over a lifetime of exposure are estimated from projected intakes and chemical-specific dose-response information. Major assumptions, scientific judgments, and to the extent possible, estimates of the uncertainties embodied in the risk assessment are also presented in this HHRA.

For each COPC having available toxicity values, a cancer risk and hazard quotient (HQ) estimate are presented. Appendix C presents the cumulative cancer risk and Hazard Index (HI = sum of all HQs for a given pathway and receptor) estimates derived for each receptor, pathway, and chemical at each site. A summary of the derived risks and hazards are presented in Table 3.4 (0-0.5 ft interval - 95% UCL method), Table 3.5 (0-10 ft interval - 95% UCL method), and Table 3.8 (0-20 ft interval - 95% UCL method). Appendix D contains the derived risk information based on the MDC method.

The maximum detected concentration of lead in site soils in all three intervals (0-0.5 ft, 0-10 ft, 0-20 ft) exceeded the USEPA lead screening value of 400 mg/kg. Consequently, the IEUBK lead model for child residents was evaluated for the 0-10 ft interval and the USEPA Adult Lead Model was evaluated for all three interval to assess potential impacts on non-residential receptors. Appendix C.4 provides the results of the lead models, which indicate that no significant risk resulting from lead exposure is expected in any receptor. Lead is not known to have been associated with past site activities, therefore, the concentrations of lead detected in site soils are likely the result of anthropogenic activities in the mixed-use area surrounding the Site.

3.6.1 Carcinogenic Effects

Carcinogenic risk is expressed as a probability of developing cancer as a result of lifetime exposure. For a given chemical and route of exposure, carcinogenic risk is calculated as follows:

Oral risk	=	exposure intake (administered dose) x oral slope factor (administered dose)
Inhalation risk	=	exposure intake (administered dose) x inhalation unit risk factor (administered dose)
Dermal risk	=	intake (absorbed dose) x oral slope factor (absorbed dose)

For simultaneous exposure to several carcinogens, USEPA assumes that the risks are additive. That is to say:

RiskT = Risk1 + Risk2 + ... + Risk*i*

Where:

RiskT = the total cancer risk, expressed as a unitless probability, and

Risk*i* = the risk estimate for the *i*th substance

Addition of the carcinogenic risks is valid when the following assumptions are met:

- Doses are low.
- No synergistic or antagonistic interactions occur.
- Background risks are assumed to be additive.

The USEPA's target range for carcinogenic risk associated with National Priorities List (NPL) sites is one-in-ten thousand (1E-04) to one-in-one million (1E-06). That is, the receptor risk due to the site should not exceed this target range. Those COPCs that are identified during the risk characterization as contributing significantly (individual cancer risk of 1×10^{-6}) to a receptor with a cumulative cancer risk of 1×10^{-4} or greater are identified as COCs. The cumulative cancer risk is defined as the summation of the risks associated with all media and all pathways of exposure. The COCs are discussed in an uncertainty analysis to determine whether they should be considered final COCs at the site.

3.6.1.1 Derived Carcinogenic Risk for the 0-0.5 ft Interval (95% UCL Method)

Table 3.4 presents the carcinogenic risks derived for receptors exposed to chemical constituents in soil in the 0-0.5 ft interval at the Site. The total receptor risks were 6 x 10^{-5} (RME) for the current/future worker, 6 x 10^{-6} (RME) for the current/future adolescent trespasser, and 5 x 10^{-6} (RME) for the future construction worker. The total receptor risks were 2 x 10^{-4} (RME) for the future resident (adult and child combined), and 4 x 10^{-5} (RME) for the future recreator (adult and child combined). The only derived cancer risk that exceeded the target of 1x 10^{-4} was for the future resident receptor.

The COCs associated with the derived risk for the 0-0.5 ft interval (95% UCL method) are presented in Table 3.6. The primary COCs identified from the risk assessment are carcinogenic PAHs in soil. The risks were attributable to ingestion and dermal contact with PAHs in soil. In addition, arsenic was identified as a COC following ingestion of soil.

3.6.1.2 Derived Carcinogenic Risk for the 0-10 ft Interval (95% UCL Method)

Table 3.5 presents the carcinogenic risks derived for receptors exposed to chemical constituents in soil in the 0-10 ft interval at the Site. These receptors were evaluated using the 95% UCL method (see Section 3.2.3). The total receptor risk for the RME exposure scenario ranged from 6 x 10^{-5} for the future construction worker to 2 x 10^{-3} for the future resident (combined child and adult). The derived cancer risks for the future industrial worker, the hypothetical future recreator and the hypothetical future resident exceeded the target risk of 1 x 10^{-4} for the 0-10 ft interval, indicating that remedial action may be warranted for the protection of these receptors. The total receptor risk did not exceed 1 x 10^{-4} for the future adolescent trespasser (RME = 7 x 10^{-5}) or the future construction worker (RME = 6 x 10^{-5}).

The COCs associated with the derived risk for the 0-10 ft interval (95% UCL method) are presented on Table 3.7. The primary COCs identified from the risk assessment are carcinogenic PAHs. The risk was primarily attributable to both ingestion and dermal contact with the PAHs in soil. In addition, arsenic and Aroclor-1254 were identified as

COCs following ingestion and benzene was identified as a COC following inhalation of volatiles generated from soil.

3.6.1.3 Derived Carcinogenic Risk for the 0-20 ft Interval (95% UCL Method)

Table 3.8 presents the carcinogenic risks derived for receptors exposed to chemical constituents in soil in the 0-20 ft interval at the Site. The total receptor risk ranged from 1 x 10^{-5} (CT) to 5 x 10^{-5} (RME) for the future construction worker exposed to deep soils. The derived risk associated with this receptor falls below the target of 1 x 10^{-4}, indicating that remedial action is not warranted for the protection of this receptor.

3.6.2 Noncarcinogenic Effects

The potential for noncarcinogenic effects is evaluated by comparing an exposure level or intake (chronic daily intake or CDI) over a specified time period with a reference dose derived for a similar exposure period. This ratio is termed the HQ. In other words, the hazard quotient equals the intake divided by the reference value, or:

Oral HQ	=	exposure intake (administered dose)/oral RfD (administered dose)
Inhalation HQ	=	intake (administered dose)/inhalation RfC (administered dose)
Dermal HQ	=	intake (absorbed dose)/oral RfD (absorbed dose)

The HQ assumes that there is a level of exposure (i.e., RfD or RfC) below which it is unlikely for even sensitive populations to experience adverse health effects. If the exposure level exceeds the threshold (i.e., if HQ exceeds unity), there may be concern for potential noncancer effects.

To assess the overall potential for noncarcinogenic effects posed by more than one chemical, an HI approach has been developed by the USEPA. This approach assumes that simultaneous subthreshold exposures to several chemicals could result in an adverse health effect. The HI is calculated as follows:

$$\text{Hazard Index (HI)} = HQ1 + HQ2 + \ldots + HQ\mathit{i}$$

Where:

$HQ\mathit{i}$ = the hazard quotient for the *i*th toxicant

It should be noted that exposure intake is taken to mean "chronic" exposure. Chronic exposure is defined as exposure that occurs over the majority of a life span.

According to USEPA (1989) guidance for noncarcinogens, it is appropriate to derive HI values based on target organ effects, instead of a cumulative HI, if necessary. Given that noncarcinogens are additive only for their specific target organs, target organ HIs are appropriate for a more complete evaluation of potential effects of exposed receptors.

Calculation of a HI in excess of 1 indicates the potential for adverse health effects. Indices greater than 1 will be generated any time intake for any of the COPCs exceeds its RfD or RfC. However, if there are two or more chemicals involved, it is possible to generate a HI greater than 1, even if none of the individual chemical intakes or concentrations exceed their respective RfDs or RfCs. If a particular COPC was determined to contribute significantly (HQ of 0.1 or greater) to a receptor HI of 1 or greater, it was identified as a COC. The cumulative HI is defined as the summation of the hazards associated with all media and all pathways of exposure.

3.6.2.1 Derived Noncarcinogenic Risk for the 0-0.5 ft Interval (95% UCL Method)

Table 3.4 presents the noncarcinogenic hazard index derived for receptors exposed to chemical constituents in soil in the 0-0.5 ft interval at the Site. The total receptor hazard indices were 0.09 (RME) for the current worker, 0.02 (RME) for the current/future adolescent trespasser, and 0.2 (RME) for the future construction worker. The total receptor hazards were 0.7 (RME) for the resident (adult and child combined), and 0.2 (RME) for the recreator (adult and child combined). All of these total receptor risks fall below the target of 1, indicating that remedial action is not warranted for the protection of these receptors.

3.6.2.2 Derived Noncarcinogenic Risk for the 0-10 ft Interval (95% UCL Method)

Table 3.5 presents the noncarcinogenic hazard indices derived for receptors exposed to chemical constituents in soil in the 0-10 ft interval at the Site. These receptors were evaluated using the 95% UCL method (see Subsection 3.4.3). The total receptor hazard indices for the RME exposure scenario ranged from 0.04 for the future adolescent trespasser to 2 for the future resident (combined child and adult). The derived hazard index exceeded the target of 1 for the future resident, but not for any other receptor. The exceedance of the target of 1 indicates that remedial action may be warranted for the protection of the residential receptor.

The COCs associated with the derived hazard index of 2 for the future resident exposed to the 0-10 ft soil interval (95% UCL method) are presented on Table 3.7. The primary COCs identified from the risk assessment are Aroclor-1254 and arsenic. In addition, benzene was identified as a COC following inhalation of volatiles generated from soil.

3.6.2.3 Derived Noncarcinogenic Risk for the 0-20 ft Interval (95% UCL Method)

Table 3.8 presents the noncarcinogenic hazard indices derived for receptors exposed to chemical constituents in soil in the 0-20 ft interval at the Site. The total receptor hazard indices ranged from 0.1 (CT) to 0.4 (RME) for the future construction worker exposed to deep soils. The derived risk associated with this receptor falls below the target of 1, indicating that remedial action is not warranted for the protection of this receptor.

3.7 UNCERTAINTY ASSESSMENT

The discussion of uncertainties is developed for the following risk assessment steps: data evaluation, exposure assessment, toxicity assessment, and risk characterization.

3.7.1 Data Evaluation

The sampling data collected at any site are inevitably a limited subset of the nearly unlimited quantity of data that potentially could be collected; as such, they may result in an underestimation or overestimation of risk. In addition, given that the objective of the sampling performed at the Site was to define the nature and extent of chemical constituents, samples were not collected randomly and may be biased toward overestimation of chemical concentrations at the Site.

Uncertainty in contaminant identification is considered low because sampling protocol generally targets appropriate analytes based on historical information and guidance. Reasonable certainty is also assumed because of the sample data validation and quality assurance/quality control (QA/QC) procedures applied to sample analysis and data evaluation.

3.7.2 Exposure Assessment

Factors that can contribute to uncertainty in the exposure assessment include identification and evaluation of exposure pathways, assumptions for scenario development, intake parameters, and derivation of exposure point concentrations.

The identification of potential exposure pathways and receptors is based on site-specific reasonable current use and hypothetical future land use. To the extent possible, site-specific receptors are identified and exposure parameters tailored to these receptors are identified to minimize uncertainty in the exposure scenarios.

Values assumed for exposure parameters (e.g., inhalation rate and exposure frequencies) used in calculations for intakes are based primarily on USEPA guidance. These assumptions may result in underestimating or overestimating the intakes calculated for specific receptors, depending on the accuracy of the assumptions relative to actual site conditions and uses. In the case of dermal exposure, there is uncertainty associated with the conversion from an administered intake to an absorbed intake because of uncertainty associated with the conversion factors.

3.7.3 Toxicity Assessment

Uncertainty is inherent in the toxicity values used to characterize the carcinogenic and noncarcinogenic risks. This chemical-specific uncertainty is incorporated into the toxicity value during its development. For example, an uncertainty factor may be applied for interspecies and intrahuman variability, for extrapolation from subchronic to chronic exposures, and/or for epidemiological data limitations. The toxicity values used in the HHRA may overestimate or underestimate risk depending on how each toxicity value was derived.

Toxicity values may not be available for some COPCs, thereby precluding their inclusion in the quantitative risk evaluation. The resulting risk estimation excludes these chemical-specific risks from the calculation, and may underestimate the total risk.

Toxicity values were not available for a quantitative evaluation of phenanthrene, dibenzofuran, benzo(g,h,i)perylene and lead. Lead was addressed using the IEUBK model for residential exposure and the USEPA Adult Lead Model for nonresidential exposure. Given that both carcinogenic and noncarcinogenic PAHs are already identified as COCs from the HHRA, the absence of an evaluation of phenanthrene and benzo(g,h,i)perylene should not significantly impact the results of the risk assessment. The absence of dibenzofuran from quantitative evaluation in the risk assessment will result in an underestimation of risk associated with exposure to soil at the Site. Given that the primary chemical constituents associated with past use of the Site, however, are PAHs, the absence of dibenzofuran from the risk assessment is not expected to significantly impact the overall results of the evaluation.

Because toxicity information is limited for many chemicals, toxicity numbers from similar or related chemicals are sometimes substituted. The use of surrogate toxicity values may underestimate or overestimate risk. For some chemicals, analytical results may not distinguish between different isomers or forms of a chemical although available toxicity information does, or vice versa. The absence of isomer specific toxicity values or isomer specific analytical results for some chemicals may tend to underestimate or overestimate risks. No surrogate compounds were used in this HHRA at the Site.

For the Site, PAHs were identified as COPCs in soils and were evaluated in the quantitative risk assessment. Toxicity values associated with the carcinogenic PAHs are derived using Toxicity Equivalency Factors (TEF), which compare carcinogenic potency of a given congener to benzo(a)pyrene. The use of TEF values to derive toxicity values for the carcinogenic PAHs may overestimate or underestimate the risk associated with the given congener, based on the accuracy of the TEF value used in the evaluation.

Methodology for the derivation of toxicity values for the assessment of dermal exposure is not available, therefore, dermal toxicity values are estimated by adjusting oral toxicity values (see Section 3.5 for methodology discussion). The assumptions made to derive the dermal toxicity values (i.e., use of a default oral absorption factor when a chemical-specific factor is not available) may overestimate or underestimate risk.

3.7.4 Risk Characterization

Some of the procedures used and uncertainties inherent in the human health assessment process may tend to underestimate or overestimate potential risk. Assumptions built into this HHRA, such as the conservative assumptions for the exposure scenarios, tend to overestimate rather than underestimate potential risks. The assumption of additivity of effects for both carcinogenic and noncarcinogenic effects may result in an overestimation or an underestimation of risk. The assumption of additivity does not allow for potential synergistic or antagonistic effects of various chemicals.

The assumption that contamination is assumed to remain constant over time also results in an overestimation or underestimation of the derived risks. Fate and transport mechanisms, which would result in the degradation and loss of some COPCs from the environment, may not be considered in the exposure evaluation for the future receptors, thereby resulting in an overestimation of risk. Conversely, the degradation of certain chemicals (i.e., trichloroethylene) may result in the generation of chemicals with equal or higher potencies (i.e., vinyl chloride), thereby resulting in an underestimation of risk.

Given that none of the chemicals identified as COCs at the Site are expected to degrade to more toxic compounds, this issue should not impact the results of the HHRA for this Site. The COCs identified for the Site are PAHs, which are not expected to significantly degrade to either less toxic or more toxic compounds.

Quantitative cancer risk estimates are typically expressed as plausible upper bounds rather than estimates of central tendency. In analyses involving several carcinogens, these upper bounds are often summed to estimate overall risk. This begs the question of whether a sum of upper bounds is itself a plausible estimate of overall risk. This question can be asked in two ways: whether the sum yields an improbable estimate of overall risk (that is, is it only remotely possible for the true sum of risks to match the sum of upper bounds), or whether the sum gives a misleading estimate (that is, the true sum of risks likely to be very different from the sum of upper bounds). Cogliano (1997) reports that an analysis of four case studies shows that as the number of risk estimates increase, their sum becomes increasingly improbable, but not misleading. Though the overall risk depends on the independence, additivity, and number of risk estimates, as well as the shapes of the underlying risk distributions, sums of upper bounds provide useful information about the overall risk and can be adjusted downward to give a more plausible (perhaps more probably) upper bound, or even a central estimate of overall risk.

3.7.5 Uncertainty Associated with the Identification of the COCs

In addition to the uncertainties discussed above, the uncertainty associated with the initial list of COCs is discussed below and final COCs for the Site are chosen.

The COCs at the Site identified for the 0-0.5 ft interval (95% UCL method) include:

- Carcinogenic PAHs
- Arsenic

The COCs at the Site identified for the 0-10 ft interval (95% UCL method) include:

- Carcinogenic PAHs
- Aroclor-1254
- Arsenic
- Benzene

Given the history of use of the Site, the frequency of detection and the concentrations of the PAHs in soil at the Site, all PAHs in soil are considered to be final COCs at the Site. A discussion of the uncertainty surrounding the identification of the other COCs as final COCs at the Site is presented below.

Aroclor-1254

Aroclor-1254 was identified as a COPC for all three soil intervals (0-0.5 ft, 0-10 ft, 0-20 ft) and was identified as a noncarcinogenic COC in child residents following ingestion of mixed surface and subsurface soils (0-10 ft). Aroclor-1254 was detected in 26% of samples in the 0-10 ft interval (16/62). The hazard associated with potential exposure to Aroclor-1254, however, is 0.14 for ingestion for the hypothetical future child resident, indicating a very low hazard associated with potential exposure to this constituent. Given that the magnitude of hazard associated with potential exposure is very low, that the likelihood of residential development of the Site is very low, and that Aroclor-1254 is not known to be associated with past use of the Site, Aroclor-1254 is not recommended as a final COC at the Site.

Arsenic

Arsenic was identified as a COPC in all three soil intervals (0-0.5 ft, 0-10 ft, 0-20 ft) and as a COC in the 0-0.5 ft and 0-10 ft interval. Arsenic is a naturally occurring metal that was detected in every soil sample obtained from the Site, but is not known to have been associated with past activities at the Site. In the three background soil samples. arsenic was detected in all three samples at concentrations of 3.7 mg/kg, 10.3 mg/kg, and 10.3 mg/kg. In addition, according to the USGS (Shacklette and Boerngen, 1984) the background concentrations of arsenic in soil in the Chicago area is approximately 10 mg/kg (geometric mean value throughout conterminous US of 5.2 mg/kg - estimated value of 10 mg/kg detected in Chicago area). An estimated background concentration of 7.2 mg/kg is cited in the Illinois Tiered Approach to Corrective Action Objectives (TACO) for counties within metropolitan statistical areas, including Cook County (the Site is located in Cook County). The maximum concentration of arsenic in Site soils was 40.7 mg/kg in the 0-0.5 ft interval

(95% UCL of 11 mg/kg), 86.4 mg/kg in the 0-10 ft interval (95% UCL of 11.5 mg/kg), and 104 mg/kg in the 0-20 ft interval (95% UCL of 12.4 mg/kg). These 95% UCL values are equivalent to site-specific background, USGS, and TACO estimates of naturally occurring background and the maximum concentrations are within an order of magnitude of these three estimates. These factors is suggest that the arsenic located at the Site may be indicative of natural background conditions.

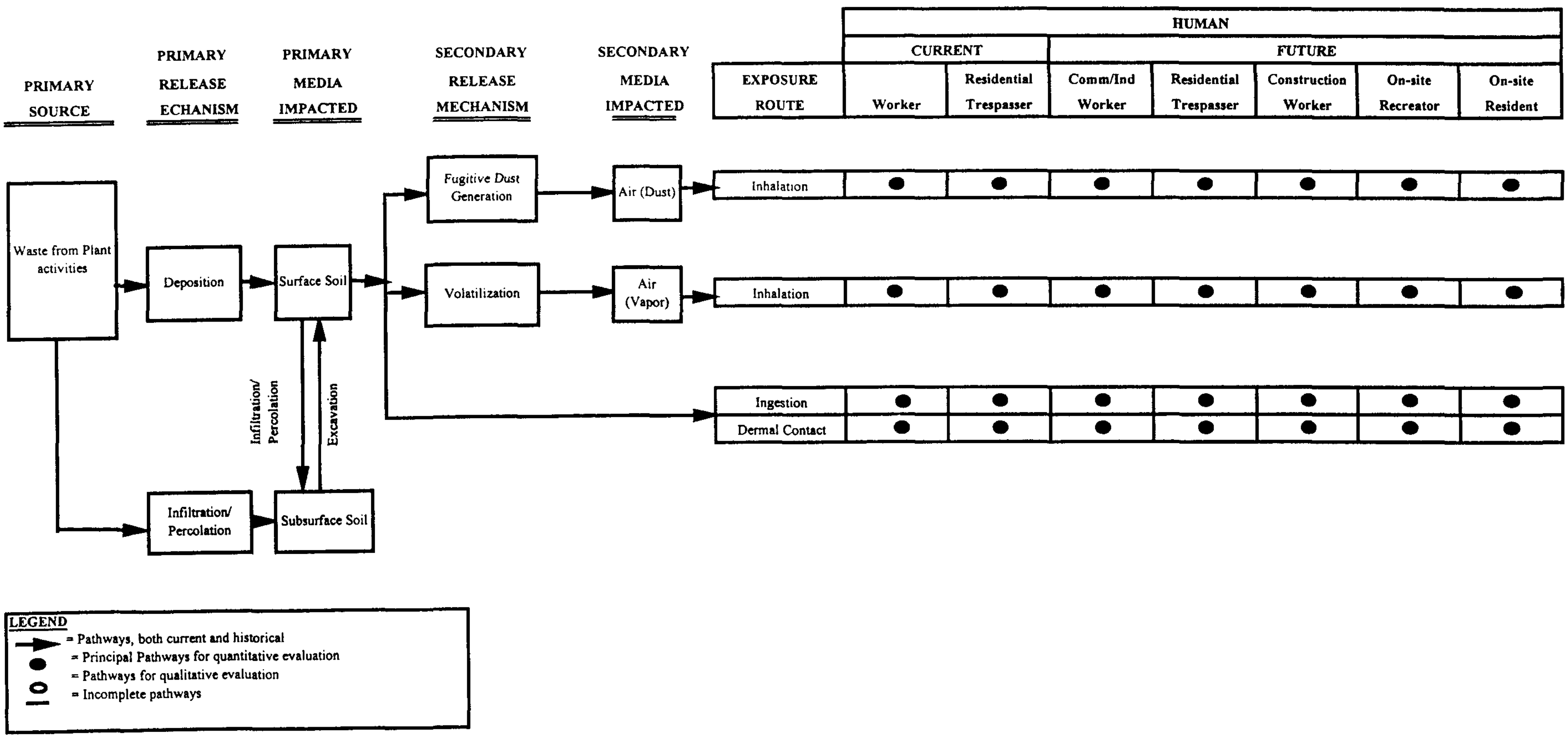
The magnitude of risk associated with potential exposure of receptors to the 95% UCL in the 0-0.5 ft and 0-10 ft interval is within the 1 x 10^{-6} to 1 x 10^{-5} range and does not exceed a risk of 1 x 10^{-4}, and the hazard quotients for arsenic do not exceed 1. Given that the risks and hazards associated with arsenic are well below the risks and hazards associated with the PAHs, and that the concentration of arsenic in Site soils is likely indicative of natural background conditions, arsenic is not recommended as a final COC for surface or mixed surface and subsurface soils at the Site.

Benzene

Benzene was identified as a COPC in the 0-10 ft and 0-20 ft interval and as a COC for receptors evaluated for the 0-10 ft interval. Benzene was detected in 9% of samples (11/125) in the 0-10 ft interval. Benzene was identified as a COC for carcinogenic and noncarcinogenic effects following inhalation of volatiles generated from soils for the future residents (Table 3.6). The concentration of benzene in air generated from soil was modeled using the USEPA Soil Screening Level Guidance (USEPA, 1996). The model provides methodology for derivation of a volatilization factor (for volatiles generated from soil) and a particulate emissions factors (for dust generated from soil) to be used in the derivation of cancer risk and hazard. Benzene was not identified as a COC from any other pathway of exposure (ingestion, dermal contact). The magnitude of risk associated with potential exposure to benzene did not exceed a cancer risk of 1 x 10^{-4} or a hazard quotient of 1. Given that the risks and hazards associated with benzene were well below the risks and hazards associated with the PAHs, benzene is not recommended as a final COC for soils at the Site.

FIGURE 3.1
HUMAN HEALTH CONCEPTUAL SITE MODEL

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS



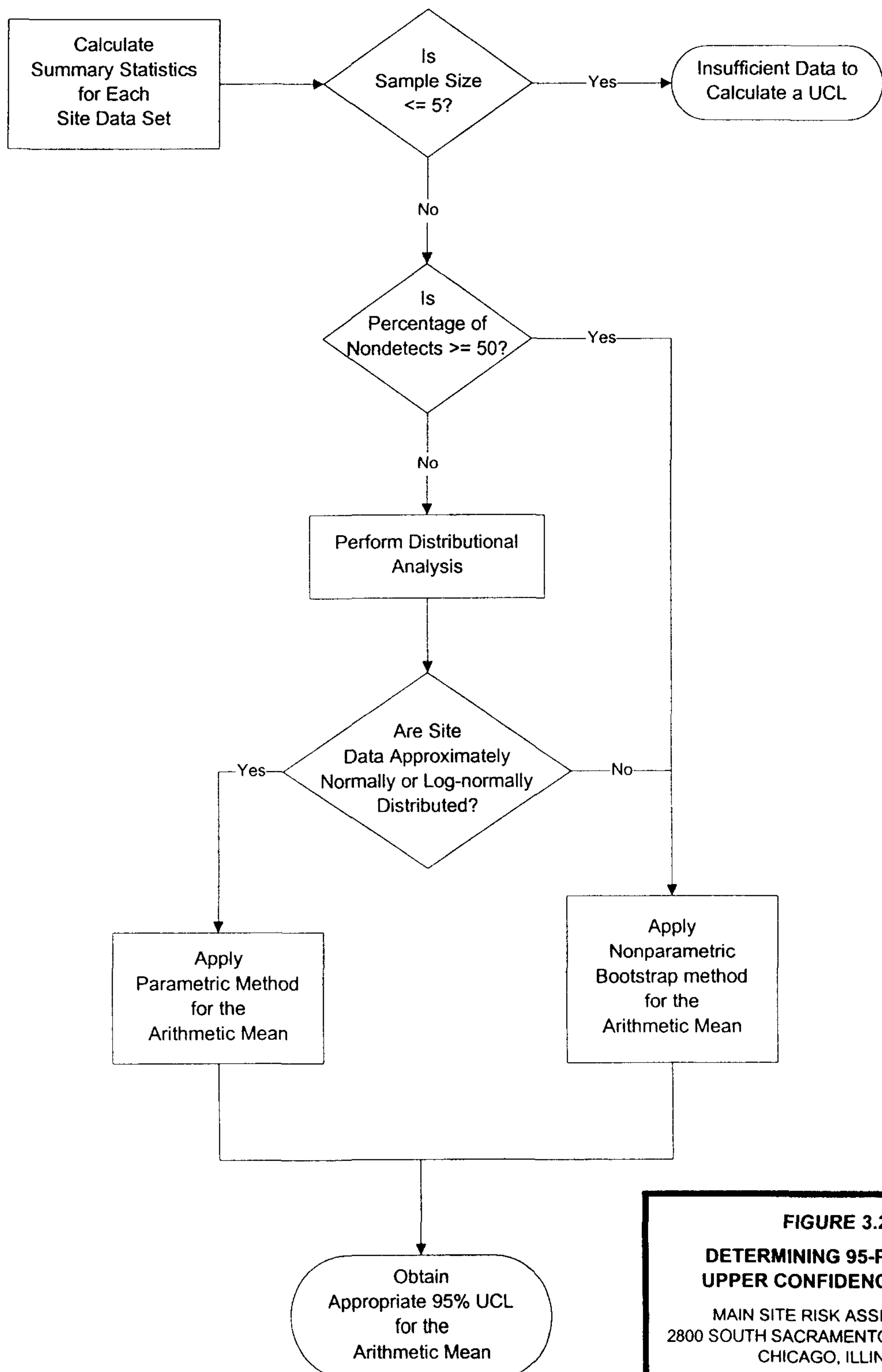


FIGURE 3.2

DETERMINING 95-PERCENT UPPER CONFIDENCE LIMITS

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

PARSONS ENGINEERING SCIENCE, INC.

TABLE 3.1
CONSTITUENTS OF POTENTIAL CONCERN (COPC) SUMMARY (1)
SOIL (MG/KG)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

			(0-0.5 ft)		(0-10 ft)		(0-20 ft)	
Class	Constituent	CAS Number	Maximum Detected Concentration	Exposure Point Concentration	Maximum Detected Concentration	Exposure Point Concentration	Maximum Detected Concentration	Exposure Point Concentration
Volatiles	Benzene	71432	--	--	5.70E+01	2.01E+00	5.70E+01	2.48E+00
Semi-Volatiles	Carbazole	86748	5.40E+01	4.25E+00	2.20E+02	1.62E+01	2.20E+02	1.66E+01
	Dibenzofuran	132649	8.20E+01	6.18E+00	1.50E+02	1.35E+01	1.50E+02	1.64E+01
PAHs	2-Methylnaphthalene	91576	--	--	3.50E+03	1.10E+02	3.50E+03	1.05E+02
	Acenaphthene	83329	--	--	1.80E+03	8.36E+01	1.80E+03	7.67E+01
	Anthracene	120127	--	--	2.40E+03	9.65E+01	2.40E+03	9.54E+01
	Benzo(a)Anthracene	56553	9.60E+01	8.92E+00	2.80E+03	1.30E+02	2.80E+03	1.12E+02
	Benzo(a)pyrene	50328	1.00E+02	8.09E+00	2.40E+03	1.16E+02	2.40E+03	9.94E+01
	Benzo(b)fluoranthene	205992	1.30E+02	1.34E+01	2.60E+03	1.26E+02	2.60E+03	1.11E+02
	Benzo(g,h,i)perylene	191242	--	--	9.60E+02	5.09E+01	9.60E+02	4.33E+01
	Benzo(k)fluoranthene	207089	5.90E+01	4.73E+00	1.40E+03	6.34E+01	1.40E+03	5.39E+01
	Chrysene	218019	9.80E+01	9.98E+00	3.90E+03	1.49E+02	3.90E+03	1.28E+02
	Dibenz(a,h)anthracene	53703	1.20E+01	1.25E+00	2.10E+02	1.41E+01	2.10E+02	1.44E+01
	Fluoranthene	206440	--	--	6.70E+03	3.13E+02	6.70E+03	2.66E+02
	Fluorene	86737	--	--	1.00E+03	6.61E+01	1.00E+03	6.12E+01
	Indeno(1,2,3-cd)pyrene	193395	4.30E+01	4.35E+00	9.00E+02	4.95E+01	9.00E+02	4.35E+01
	Naphthalene	91203	--	--	2.90E+03	1.59E+02	2.90E+03	1.78E+02
	Phenanthrene	85018	3.50E+02	1.39E+01	8.10E+03	3.46E+02	8.10E+03	3.19E+02
	Pyrene	129000	--	--	5.20E+03	2.50E+02	5.20E+03	2.15E+02
Metals	Arsenic	7440382	4.07E+01	1.10E+01	8.64E+01	1.15E+01	1.04E+02	1.24E+01
	Barium	7440393	2.22E+03	1.77E+02	2.22E+03	1.12E+02	2.22E+03	1.06E+02
	Cadmium	7440439	1.56E+01	2.03E+00	3.64E+01	2.34E+00	3.64E+01	2.06E+00
	Chromium	7440473	3.19E+02	4.23E+01	3.69E+02	4.01E+01	3.69E+02	3.72E+01
	Lead	7439921	1.61E+03	1.57E+02	1.61E+03	1.10E+02	2.68E+03	1.26E+02
	Mercury	7439976	--	--	--	--	2.71E+01	6.94E-01
Pesticides/PCBs	Aroclor-1254	11097691	4.40E+00	4.11E-01	4.40E+00	4.36E-01	4.40E+00	3.97E-01
	Dieldrin	60571	1.40E-01	1.69E-02	1.40E-01	1.88E-02	1.40E-01	1.81E-02

The maximum detected concentration is used in the screening process and the exposure point concentration is used in the quantitative human health risk assessment.

TABLE 3.2
EXPOSURE ASSUMPTIONS USED FOR HUMAN HEALTH RISK ASSESSMENT
CURRENT AND FUTURE RECEPTORS

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

			Soils																							
			Worker**				Adolescent Trespasser				Adult Recreator				Child Recreator				Adult Resident				Child Resident			
Factors		Units	RME	Ref	CT	Ref	RME	Ref	CT	Ref	RME	Ref	CT	Ref	RME	Ref	CT	Ref	RME	Ref	CT	Ref	RME	Ref	CT	Ref
Body Wt. (BW)	BW	kg	70	1,5	70	1,5	45	1, 5	45	1,5	70	1, 5	70	1,5	15	2,5	15	2,5	70	1, 5	70	1,5	15	2,5	15	2,5
Exposure Duration (ED)	ED	yr.	25	5,6	5	5,6	10	5,6	10	5	24	5,6	7	5	6	5,6	2	5	24	5,6	7	5	6	5,6	2	5
Exposure Frequency (EF)	EF	d/yr.	250	1,2,5,6	234	5	50	7	25	7	100	7	50	7	100	7	50	7	350	1,2,5,6	250	7	350	1,2,5,6	250	7
Exposure Time (ET)	ET	hr/d	8	1	8	1	4	1	2	1	4	1	2	1	4	1	2	1	24	1	24	1	24	1	24	1
Adherence Factor Soil to Skin (AF)	AF	mg/cm^2	1	4,6	0.2	4,6	1	4,6	0.2	4,6	1	4,6	0.2	4,6	1	4, 6	0.2	4,6	1	4,6	0.2	4,6	1	4, 6	0.2	4,6
Skin Surface Area Available for Contact (SA)	SA	cm^2	5800	4a	5000	4a	4,400	4a	3,350	4a	5,800	4a	5,000	4a	2,300	4a	1,980	4a	5,800	4a	5,000	4a	2,300	4a	1,980	4a
Ingestion Rate (IR_o)	IRo	mg/d	100	1,5	50	5	100	1,5	50	5	100	1,5	50	5	200	5	100	5	100	1,5	50	5	200	5	100	5
Inhalation Rate (IR_i)	IRi	m^3/hr	1.25	7	1.25	7	0.83	6	0.83	6	0.83	6	0.83	6	0.625	6	0.625	6	0.83	6	0.83	6	0.625	6	0.625	6
Fraction Ingested from Contaminated Sources (FI)	FI	unitless	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7	0.5	7
Absorption Factor (ABSo), organics	ABS	unitless	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6	1%	6
Absorption Factor (ABSi), inorganics	ABSi	unitless	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6	0.10%	6

Note:

** - The values on the table are for the industrial worker. For future construction workers, the following values are used:
ED = 1 yr (RME and CT); IRo = 480 mg/day (RME) and 100 mg/day(CT).
Ingestion rate, IR, is expressed in mg/day for soil and sediment, and l/day for groundwater and surface water.

References:
(1) EPA, 1989 - RAGS
(2) EPA, 1991a - Supplemental Guidance to RAGS
(3) EPA, 1997 - Exposure Factors Handbook
(4) EPA, 1992a - Dermal Guidance
(5) EPA, 1993a - Region VIII Guidance for the RME and CT
(6) EPA, 1995a - Region IV Supplemental Guidance
(7) Best Professional Judgement -
a - Reflects exposure of 25% of the total body surface area.

TABLE 3.3
TOXICITY VALUES [1]

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

COPC[2]	CAS No.	Toxicity Class[3]	CAG Group[4]	ORfD (mg/kg-d)[5]	OSF (kg-d/mg)[6]	OABS (unitless)[7]	DRfD (mg/kg-d)[8]	DSF (kg-d/mg)[9]	RfC (mg/m^3)[10]	IUR (m^3/µg)[11]	DABS (Derm Abs) (unitless)[12]
Volatiles											
Benzene	71432	NC,C	A	3.00E-03	2.90E-02	9.50E-01	2.85E-03	3.05E-02	6.00E-03	8.30E-06	1.00E-02
Semi-Volatiles											
Acenaphthene	83329	NC	NR	6.00E-02	--	5.00E-01	3.00E-02	--	--	--	1.00E-02
Anthracene	120127	NC	D	3.00E-01	--	5.00E-01	1.50E-01	--	--	--	1.00E-02
Benzo(a)anthracene	56553	C	B2	--	7.30E-01	5.00E-01	--	1.46E+00	--	8.80E-05	1.00E-02
Benzo(a)pyrene	50328	C	B2	--	7.30E+00	5.00E-01	--	1.46E+01	--	8.80E-04	1.00E-02
Benzo(b)fluoranthene	205992	C	B2	--	7.30E-01	5.00E-01	--	1.46E+00	--	8.80E-05	1.00E-02
Benzo(g,h,i)perylene	191242	NC	D	--	--	5.00E-01	--	--	--	--	1.00E-02
Benzo(k)fluoranthene	207089	C	B2	--	7.30E-02	5.00E-01	--	1.46E-01	--	8.80E-06	1.00E-02
Carbazole	86748	C	B2	--	2.00E-02	5.00E-01	--	4.00E-02	--	--	1.00E-02
Chrysene	218019	C	B2	--	7.30E-03	5.00E-01	--	1.46E-02	--	8.80E-07	1.00E-02
Dibenz(a,h)anthracene	53703	C	B2	--	7.30E+00	5.00E-01	--	1.46E+01	--	8.80E-04	1.00E-02
Dibenzofuran	132649	NC	D	--	--	5.00E-01	--	--	--	--	1.00E-02
Fluoranthene	206440	NC	D	4.00E-02	--	5.00E-01	2.00E-02	--	--	--	1.00E-02
Fluorene	86737	NC	D	4.00E-02	--	5.00E-01	2.00E-02	--	--	--	1.00E-02
Indeno(1,2,3-c,d)pyrene	193395	C	B2	--	7.30E-01	5.00E-01	--	1.46E+00	--	8.80E-05	1.00E-02
2-Methylnaphthalene	91576	NR	NR	4.00E-02	--	5.00E-01	2.00E-02	--	--	--	1.00E-02
Naphthalene	91203	NC	D	4.00E-02	--	5.00E-01	2.00E-02	--	--	--	1.00E-02
Phenanthrene	85018	NC	D	--	--	5.00E-01	--	--	--	--	1.00E-02
Pyrene	129000	NC	D	3.00E-02	--	5.00E-01	1.50E-02	--	--	--	1.00E-02
Pesticides / PCBs											
Dieldrin	60571	NC,C	B2	5.00E-05	1.60E+01	5.00E-01	2.50E-05	3.20E+01	--	4.60E-03	1.00E-02
PCB-1254 (Arochlor 1254)	11097691	NC,C	B2	2.00E-05	2.00E+00	9.00E-01	1.80E-05	2.22E+00	--	1.00E-04	1.00E-02
Inorganics											
Arsenic	7440382	NC,C	A	3.00E-04	1.50E+00	8.00E-01	2.40E-04	1.88E+00	--	4.30E-03	1.00E-03
Barium	7440393	NC	NR	7.00E-02	--	5.00E-02	3.50E-03	--	5.00E-04	--	1.00E-03
Cadmium	7440439	C	B1	5.00E-04	--	2.00E-02	1.00E-05	--	--	1.80E-03	1.00E-03
Chromium VI	7440473	C	A	5.00E-03	--	2.00E-02	1.00E-04	--	--	1.20E-02	1.00E-03
Lead	7439921	C	B2	--	--	1.50E-01	--	--	--	--	1.00E-03
Mercury	7439976	NC	D	3.00E-04	--	1.00E-02	3.00E-06	--	3.00E-04	--	1.00E-03

Notes:
1. All values from IRIS (EPA, 1998c) if available. HEAST (EPA 1995b) used if IRIS values unavailable.
2. Chemicals of Potential Concern.
3. Toxicity Class: C - Carcinogen, NC - Non-Carcinogen.
4. CAG - USEPA Carcinogen Assessment Group. NR - Not Reported
5. ORfD - oral reference dose.
6. OSF - oral slope factor.
7. OABS - oral absorption factors from appropriate ATSDR Profiles (ATSDR 1988 - 1994) or default values (see text).
8. DRfD - dermal RfD = oral RfD x oral absorption factor.
9. *DSF - dermal SF = oral SF/oral absorption factor.*
10. RfC - inhalation reference concentration.
11. IUR - inhalation unit risk.
12. DABS - dermal absorption factor according to USEPA (1995a)

TABLE 3.4
MEDIA RISK SUMMARY BY RECEPTOR
SURFACE SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Exposure Route	Cancer Risk		Noncarcinogenic Hazard Quotient	
	RME[1]	CT[2]	RME[1]	CT[2]
Current/Future Industrial Worker				
Ingestion	2E-05	2E-06	4E-02	2E-02
Dermal Contact	4E-05	1E-06	5E-02	9E-03
Inhalation of Particulates	9E-08	2E-08	2E-04	2E-04
Inhalation of Volatiles	NC	NC	NC	NC
Receptor Total	6E-05	3E-06	9E-02	3E-02
Current/Future Adolescent Trespasser				
Ingestion	2E-06	6E-07	1E-02	3E-03
Dermal Contact	3E-06	3E-07	1E-02	1E-03
Inhalation of Particulates	4E-09	1E-09	2E-05	4E-06
Inhalation of Volatiles	NC	NC	NC	NC
Receptor Total	6E-06	8E-07	2E-02	4E-03
Future Construction Worker				
Ingestion	4E-06	7E-07	2E-01	3E-02
Dermal Contact	1E-06	2E-07	5E-02	9E-03
Inhalation of Particulates	4E-09	4E-09	2E-04	2E-04
Inhalation of Volatiles	NC	NC	NC	NC
Receptor Total	5E-06	9E-07	2E-01	4E-02
HYPOTHETICAL RESIDENT				
Future Adult Resident				
Ingestion	2E-05	3E-06	5E-02	2E-02
Dermal Contact	5E-05	2E-06	8E-02	9E-03
Inhalation of Particulates	3E-07	5E-08	5E-04	3E-04
Inhalation of Volatiles	NC	NC	NC	NC
Adult Total	7E-05	4E-06	1E-01	3E-02
Future Child Resident				
Ingestion	6E-05	7E-06	5E-01	2E-01
Dermal Contact	2E-05	9E-07	1E-01	2E-02
Inhalation of Particulates	2E-07	5E-08	2E-03	1E-03
Inhalation of Volatiles	NC	NC	NC	NC
ChildTotal	8E-05	8E-06	6E-01	2E-01
TOTAL FOR RESIDENT:	2E-04	1E-05	7E-01	2E-01
HYPOTHETICAL RECREATOR				
Future Adult Recreator				
Ingestion	7E-06	5E-07	1E-02	4E-03
Dermal Contact	1E-05	4E-07	2E-02	2E-03
Inhalation of Particulates	1E-08	9E-10	2E-05	5E-06
Inhalation of Volatiles	NC	NC	NC	NC
Adult Total	2E-05	9E-07	4E-02	5E-03
Future Child Recreator				
Ingestion	2E-05	1E-06	1E-01	3E-02
Dermal Contact	6E-06	2E-07	4E-02	3E-03
Inhalation of Particulates	1E-08	9E-10	8E-05	2E-05
Inhalation of Volatiles	NC	NC	NC	NC
Child Total	2E-05	2E-06	2E-01	4E-02
TOTAL FOR RECREATOR:	4E-05	2E-06	2E-01	4E-02

Note:
1 RME - reasonable maximum exposure.
2 CT - central tendency
NC - not calculable due to lack of toxicity data for COPC.

TABLE 3.5
MEDIA RISK SUMMARY BY RECEPTOR
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EXPOSURE POINT CONCENTRATION (1)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Future Receptor/Exposure Route	Cancer Risk		Noncarcinogenic Hazard Quotient	
	RME(2)	CT(3)	RME(2)	CT(3)
Adolescent Trespasser				
Ingestion	**3E-05**	**7E-06**	**2E-02**	4E-03
Dermal Contact	**5E-05**	**3E-06**	**2E-02**	2E-03
Inhalation of Particulates	5E-09	1E-09	1E-05	3E-06
Inhalation of Volatiles	3E-08	9E-09	5E-03	1E-03
Receptor Total	**7E-05**	**1E-05**	**4E-02**	**7E-03**
Future Industrial Worker				
Ingestion	**2E-04**	**2E-05**	**5E-02**	2E-02
Dermal Contact	**5E-04**	**2E-05**	**8E-02**	1E-02
Inhalation of Particulates	1E-07	2E-08	1E-04	1E-04
Inhalation of Volatiles	**8E-07**	**2E-07**	**5E-02**	4E-02
Receptor Total	**7E-04**	**4E-05**	**2E-01**	**8E-02**
Future ConstructionWorker				
Ingestion (mixed soils)	**4E-05**	**8E-06**	**2E-01**	5E-02
Dermal Contact (mixed soils)	**2E-05**	**3E-06**	**8E-02**	1E-02
Inhalation of Particulates	5E-09	4E-09	1E-04	1E-04
Inhalation of Volatiles	3E-08	3E-08	5E-02	4E-02
Receptor Total	**6E-05**	**1E-05**	**4E-01**	**1E-01**
HYPOTHETICAL RESIDENT:				
Hypothetical Resident - Adult				
Ingestion	**3E-04**	**3E-05**	**7E-02**	2E-02
Dermal Contact	**6E-04**	**2E-05**	**1E-01**	1E-02
Inhalation of Particulates	3E-07	6E-08	3E-04	2E-04
Inhalation of Volatiles	**2E-06**	**5E-07**	**1E-01**	9E-02
Adult Total	**9E-04**	**5E-05**	**3E-01**	**1E-01**
Hypothetical Resident - Child				
Ingestion	**7E-04**	**8E-05**	**7E-01**	**2E-01**
Dermal Contact	**3E-04**	**1E-05**	**2E-01**	3E-02
Inhalation of Particulates	3E-07	6E-08	1E-03	7E-04
Inhalation of Volatiles	**2E-06**	**5E-07**	**5E-01**	3E-01
Child Total	**1E-03**	**9E-05**	**1E+00**	**6E-01**
TOTAL FOR RESIDENT:	**2E-03**	**1E-04**	**2E+00**	**7E-01**
HYPOTHETICAL RECREATOR:				
Hypothetical Recreator - Adult				
Ingestion	**8E-05**	**6E-06**	**2E-02**	5E-03
Dermal Contact	**2E-04**	**5E-06**	**3E-02**	3E-03
Inhalation of Particulates	1E-08	1E-09	1E-05	3E-06
Inhalation of Volatiles	1E-07	8E-09	6E-03	2E-03
Adult Total	**3E-04**	**1E-05**	**6E-02**	**9E-03**
Hypothetical Recreator - Child				
Ingestion	**2E-04**	**2E-05**	**2E-01**	5E-02
Dermal Contact	**9E-05**	**2E-06**	**6E-02**	5E-03
Inhalation of Particulates	1E-08	1E-09	5E-05	1E-05
Inhalation of Volatiles	9E-08	8E-09	2E-02	5E-03
Receptor Total	**3E-04**	**2E-05**	**3E-01**	**6E-02**
TOTAL FOR RECREATOR:	**5E-04**	**3E-05**	**3E-01**	**7E-02**

Note:

1. The lesser of the 95% UCL and the maximum detected concentration is used as the exposure point concentration.
2. RME - reasonable maximum exposure.
3. CT - central tendency

NC - not calculable due to lack of toxicity data for COPC.

TABLE 3.6
CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA (1)
SURFACE SOIL (0 - 0.5 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION AS 95% UCL (95% UCL METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	Cancer Risk	HQ
HYPOTHETICAL FUTURE RESIDENTS: ADULT				
Surface Soil (0-0.5 ft)	Ingestion	Benzo(a)anthracene	1.53E-06	NA
		Benzo(a)pyrene	1.39E-05	NA
		Benzo(b)fluoranthene	2.30E-06	NA
		Dibenz(a,h)anthracene	2.14E-06	NA
		Arsenic	3.87E-06	NA
	Dermal Contact	Benzo(a)anthracene	3.55E-06	NA
		Benzo(a)pyrene	3.22E-05	NA
		Benzo(b)fluoranthene	5.33E-06	NA
		Dibenz(a,h)anthracene	4.97E-06	NA
		Indeno(1,2,3-c,d)pyrene	1.73E-06	NA
HYPOTHETICAL FUTURE RESIDENTS: CHILD				
Surface Soil (0-0.5 ft)	Ingestion	Benzo(a)anthracene	3.57E-06	NA
		Benzo(a)pyrene	3.24E-05	NA
		Benzo(b)fluoranthene	5.36E-06	NA
		Dibenz(a,h)anthracene	5.00E-06	NA
		Indeno(1,2,3-c,d)pyrene	1.74E-06	NA
		Arsenic	9.04E-06	NA
	Dermal Contact	Benzo(a)anthracene	1.64E-06	NA
		Benzo(a)pyrene	1.49E-05	NA
		Benzo(b)fluoranthene	2.47E-06	NA
		Dibenz(a,h)anthracene	2.30E-06	NA

(1) Chemicals of Concern are defined as those chemicals that contribute significantly to a total receptor Hazard Index (HI) greater than 1 or a cancer risk greater than 1×10^{-4}.
Significant contributions are defined as chemicals with a Hazard Quotient (HQ) greater than 0.1 or a cancer risk greater than 1×10^{-6}.

TABLE 3.7
CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA [1]
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION AS 95% UCL (95% UCL METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	Cancer Risk	HQ
HYPOTHETICAL RESIDENTS: CHILD				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzo(a)anthracene	5.20E-05	NA
		Benzo(a)pyrene	4.64E-04	NA
		Benzo(b)fluoranthene	5.04E-05	NA
		Benzo(k)fluoranthene	2.54E-06	NA
		Dibenz(a,h)anthracene	5.64E-05	NA
		Indeno(1,2,3-c,d)pyrene	1.98E-05	NA
		Aroclor-1254	NA	1.4E-01
		Arsenic	9.45E-06	2.5E-01
	Dermal Contact	Benzo(a)anthracene	2.39E-05	NA
		Benzo(a)pyrene	2.13E-04	NA
		Benzo(b)fluoranthene	2.32E-05	NA
		Benzo(k)fluoranthene	1.17E-06	NA
		Dibenz(a,h)anthracene	2.59E-05	NA
		Indeno(1,2,3-c,d)pyrene	9.11E-06	NA
	Inhalation of VOCs	Benzene	1.96E-06	4.6E-01
HYPOTHETICAL RECREATORS: ADULT				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzo(a)anthracene	6.37E-06	NA
		Benzo(a)pyrene	5.68E-05	NA
		Benzo(b)fluoranthene	6.17E-06	NA
		Dibenz(a,h)anthracene	6.91E-06	NA
		Indeno(1,2,3-c,d)pyrene	2.42E-06	NA
		Arsenic	1.16E-06	NA
	Dermal Contact	Benzo(a)anthracene	1.48E-05	NA
		Benzo(a)pyrene	1.32E-04	NA
		Benzo(b)fluoranthene	1.43E-05	NA
		Dibenz(a,h)anthracene	1.60E-05	NA
		Indeno(1,2,3-c,d)pyrene	5.62E-06	NA
HYPOTHETICAL RECREATORS: CHILD				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzo(a)anthracene	1.49E-05	NA
		Benzo(a)pyrene	1.33E-04	NA
		Benzo(b)fluoranthene	1.44E-05	NA
		Benzo(k)fluoranthene	7.25E-07	NA
		Dibenz(a,h)anthracene	1.61E-05	NA
		Indeno(1,2,3-c,d)pyrene	5.66E-06	NA
		Arsenic	2.70E-06	NA
	Dermal Contact	Benzo(a)anthracene	6.83E-06	NA
		Benzo(a)pyrene	6.10E-05	NA
		Benzo(b)fluoranthene	6.62E-06	NA
		Dibenz(a,h)anthracene	7.41E-06	NA
		Indeno(1,2,3-c,d)pyrene	2.60E-06	NA

(1) Chemicals of Concern are defined as those chemicals that contribute significantly to a total receptor Hazard Index (HI) greater than 1 or a cancer risk greater than 1×10^{-4}.
Significant contributions are defined as chemicals with a Hazard Quotient (HQ) greater than 0.1 or a cancer risk greater than 1×10^{-6}.

TABLE 3.8
MEDIA RISK SUMMARY BY RECEPTOR
MIXED SURFACE AND SUBSURFACE SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Exposure Route	Cancer Risk		Noncarcinogenic Hazard Quotient	
	RME(1)	CT(2)	RME(1)	CT(2)
Future ConstructionWorker				
Ingestion (mixed soils)	4E-05	7E-06	2E-01	5E-02
Dermal Contact (mixed soils)	2E-05	3E-06	9E-02	1E-02
Inhalation of Particulates	4E-09	4E-09	1E-04	9E-05
Inhalation of Volatiles	4E-08	4E-08	6E-02	5E-02
Receptor Total	5E-05	1E-05	4E-01	1E-01

Note:
1. RME - reasonable maximum exposure.
2. CT - central tendency'
NC - not calculable due to lack of toxicity data for COPC.

SECTION 4
SUMMARY OF THE HUMAN HEALTH RISK ASSESSMENT

4.1 HHRA GENERAL RECOMMENDATIONS

Potential exposure of both current and future human receptors to surface soil (0-0.5 ft) and mixed surface and subsurface soil (0-10 ft and 0-20 ft) was quantitatively evaluated in the HHRA. COCs are defined as those constituents identified during the risk assessment as contributing significantly (individual cancer risk of greater than 1 x 10^{-6}) to a receptor with a total cumulative lifetime cancer risk of 1 x 10^{-4} or greater. COCs were identified for hypothetical future residents exposed to the 0-0.5 ft interval and for all potential future receptors exposed to the 0-10 ft interval. COCs were not identified for the remaining receptors exposed to the 0-0.5 ft interval or for any receptor exposed to the 0-20 ft interval because the cumulative cancer risk and hazard indices did not exceed the USEPA targets of 1 x 10^{-4} and 1.0, respectively.

The COCs identified from the HHRA include carcinogenic PAHs, Aroclor-1254 (0-10 ft interval only), arsenic and benzene (0-10 ft interval only). The uncertainty analysis presented in Subsection 3.7 recommends that all PAHs in soils be considered final COCs at the Site. It also recommends that for Site soils, Aroclor-1254, arsenic, and benzene be dropped from further consideration based on the magnitude of the hazard/risk associated with exposure and the fact that the on-site concentrations of arsenic could be indicative of natural background concentrations.

SECTION 5
DEVELOPMENT OF HUMAN HEALTH REMEDIAL GOAL OPTIONS

5.1 GENERAL OVERVIEW OF APPROACH

Chemical-specific RGOs are concentration goals for individual chemicals for specific media and land use scenarios at CERCLA sites. Per USEPA guidance (USEPA 1991b), RGOs are derived for COCs identified from the HHRA and any appropriate ARAR screening (i.e., MCL screening). There are no appropriate ARARs for soils at the Site.

Separate calculations were made for each of three target risk levels for both cancer and noncancer concerns to facilitate the development of a range of appropriate remedial criteria. The target excess cancer risk levels are 1.0×10^{-4}, 1.0×10^{-5}, and 1.0×10^{-6}. The target hazard quotients (noncancer) are 3.0, 1.0, and 0.1 (USEPA, 1995a). Table 5.1 presents RGOs for the COCs identified from the HHRA for the 0-0.5 ft interval (95% UCL method) and Table 5.2 for the 0-10 ft interval (95% UCL method).

RGOs can be calculated in a simplified manner using the ratio of the calculated risk to the target risk as a multiplier for the exposure point concentration. RGOs can also be calculated in a more comprehensive manner where the risk equations are re-arranged and substituted with target risk levels to allow the back calculation of a target concentration. Because the comprehensive approach provides a more thorough consideration of media and pathway-specific contributions to risk, this latter method was chosen for calculating the RGOs for the Site.

The comprehensive approach makes use of (1) site-specific exposure factors used in the HHRA [e.g., intake rates, exposure frequencies], (2) standard USEPA toxicity values [i.e., slope factors and reference doses], and (3) target cancer and noncancer risk levels. This collection of parameters provides all of the variables needed to calculate RGOs.

Since risk estimates may indicate the need to calculate RGOs for each receptor, separate calculations are made incorporating each set of exposure factors. The exposure factors used in calculating the RGOs are the same as those used in the HHRA and presented in Appendix C.

The rearranged risk equations used in this HHRA represent an extension of the approach used in *RAGS, Part B: Development of Risk-Based Preliminary Remediation Goals* (USEPA 1991b) to include consideration of site-specific exposure factors and the exposure potentially received through inhalation pathways.

5.2 RGO CALCULATION EQUATIONS

RGOs calculated for soil account for intake from ingestion as well as dermal and inhalation pathways of exposure for all receptors.

5.2.1. Cancer-Risk-Based Soil RGOS

$$RGO = TR \times \frac{BW \times ATC \times CF1}{(EF \times ED) \times \left((SFo \times IRo) + (SFd \times SA \times AF \times ABS) + \left(SFi \times IRi \times \left(\frac{1}{VF} + \frac{1}{PEF}\right)\right)\right)}$$

where:

TR = Target Risk Level -- 1.0×10^{-4}, 1.0×10^{-5}, or 1.0×10^{-6}

BW = Body Weight -- receptor specific

ATC = Averaging Time (Cancer) -- 25,550 days (=70 years)

CF1 = Conversion Factor -- 1.0×10^{6} mg/kg

EF = Exposure Frequency -- receptor specific

ED = Exposure Duration -- receptor specific

SFo = Oral Slope Factor -- chemical specific

IRo = Oral Intake Rate -- receptor specific

SFd = Dermal Slope Factor -- chemical specific

SA = Surface Area -- receptor specific

AF = Soil Adherence Factor – 1.0

ABS = Dermal Absorbance Factor -- chemical specific

SFi = Inhalation Slope Factor -- chemical specific

IRi = Inhalation Rate -- receptor specific

VF = Volatilization Factor -- chemical specific

PEF = Particulate Emissions Factor -- chemical specific

Values for receptor-specific parameters are found in Table 3.2 and in Appendix C.

For those chemicals where toxicity values (e.g., inhalation slope factors) were not available, the corresponding portion of the equation was omitted.

5.2.2 Noncancer-Risk-Based Soil RGOs

$$RGO = THI \times \frac{BW \times ATN \times CF1}{(EF \times ED) \times \left(\left(\frac{IRo}{RfDo}\right) + \left(\frac{SA \times AF \times ABS}{RfDd}\right) + \left(\frac{IRi \times \left(\frac{1}{VF} + \frac{1}{PEF}\right)}{RfDi}\right) \right)}$$

where:

THI = Target Hazard Index (3.0, 1.0, or 0.1)

BW = Body Weight -- receptor specific

ATN = Averaging Time (Noncancer) -- receptor specific

CF1 = Conversion Factor -- 1.0 x 10^6 mg/kg

EF = Exposure Frequency -- receptor specific

ED = Exposure Duration -- receptor specific

IRo = Oral Intake Rate -- receptor specific

RfDo = Oral Reference Dose -- chemical specific

SA = Surface Area -- receptor specific

AF = Soil Adherence Factor - 1.0

ABS = Dermal Absorbance Factor -- chemical specific

RfDd = Dermal Reference Dose -- chemical specific

IRi = Inhalation Rate -- receptor specific

VF = Volatilization Factor -- chemical specific

PEF = Particulate Emissions Factor -- chemical specific

RfDi = Inhalation Reference Dose -- chemical specific

Values for receptor-specific parameters are found in Table 3.2 and Appendix C.

For those chemicals where toxicity values (e.g., inhalation reference doses) were not available, the relevant portion of the equation was omitted.

The range of RGO values presented in Tables 5.1 and 5.2 (1×10^{-4} to 1×10^{-6} cancer risk and 0.1 to 3 HI) are intended to be used to evaluate potential remedial alternatives for the Site. The exposure point concentrations (95% UCL method) for each COC used in the risk assessment are also presented on Tables 5.1 and 5.2.

5.3 RISK LEVEL AND RGO SELECTION

When selecting an appropriate level of risk at which a cleanup level will be set for a site, the National Contingency Plan (NCP; USEPA 1990) allows for RGOs which fall within a specific risk range (i.e., for carcinogens, a risk of 1×10^{-4} to 1×10^{-6}). Specifically, the NCP states that:

> "*For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 1×10^{-4} and 1×10^{-6} using information on the relationship between dose and response. The 1×10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a Site or multiple pathways of exposure.*"

While the 1 x 10^{-6} risk is the most conservative end of the risk range, the NCP allows for a choice of risk other than the most conservative, stating that:

> *"...a variety of site-specific or remedy-specific factors ... will enter into the determination of where within the risk range of 1 x 10^{-4} to 1 x 10^{-6} the cleanup standard for a given contaminant will be established."*

For the Site EE/CA, the residential risk assessment report entitled the "*Deterministic and Probabilistic Calculations to Estimate Risk-Based Cleanup Goals for Soils at Residences Near the 2800 South Sacramento Site, Chicago, Illinois", 25 October 1996,* prepared by the Alceon Corporation, selected 1 x 10^{-4} as the risk level for the residential area adjacent to the Site. The 1 x 10^{-4} risk level is also recommended for the Site. Refer to Tables 5.1 and 5.2 for remedial goals associated with this risk level.

TA[illegible] 5.1
HUMAN HEALTH REMEDIAL GOAL OPTIONS (RGOs) BY RECEPTOR
SURFACE SOIL (0-0.5 FT)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Medium and Receptor	Constituent of Concern	Exposure Point Concentration(1)	Concentration at Target Cancer Risk (ppm)			Concentration at Target Hazard Quotient (ppm)(2)		
			1.00E-04	1.00E-05	1.00E-06	3	1	0.1
SURFACE SOIL (3)								
Future Resident: Adult	Benzo(a)anthracene	8.92E+00	1.76E+02	1.76E+01	1.76E+00	--	--	--
	Benzo(a)pyrene	8.09E+00	1.76E+01	1.76E+00	1.76E-01	--	--	--
	Benzo(b)fluoranthene	1.34E+01	1.76E+02	1.76E+01	1.76E+00	--	--	--
	Dibenz(a,h)anthracene	1.25E+00	1.76E+01	1.76E+00	1.76E-01	--	--	--
	Indeno(1,2,3-c,d)pyrene	4.35E+00	1.76E+02	1.76E+01	1.76E+00	--	--	--
	Arsenic	1.10E+01	2.47E+02	2.47E+01	2.47E+00	--	--	--
Future Resident: Child	Benzo(a)anthracene	8.92E+00	1.71E+02	1.71E+01	1.71E+00	--	--	--
	Benzo(a)pyrene	8.09E+00	1.71E+01	1.71E+00	1.71E-01	--	--	--
	Benzo(b)fluoranthene	1.34E+01	1.71E+02	1.71E+01	1.71E+00	--	--	--
	Dibenz(a,h)anthracene	1.25E+00	1.71E+01	1.71E+00	1.71E-01	--	--	--
	Indeno(1,2,3-c,d)pyrene	4.35E+00	1.71E+02	1.71E+01	1.71E+00	--	--	--
	Arsenic	1.10E+01	1.18E+02	1.18E+01	1.18E+00	--	--	--

Note:
-- indicates that the analyte is not a preliminary COC for the media/receptor of concern.
NC Not calculated, no criteria or toxicity information available.
1. Exposure point concentration currently estimated for this medium
2. The RGO was derived using the following simplified equation:
   RGO = EPC x target HI/derived HI
   where: target HI = 1.0
   derived HI = total receptor HI derived in the risk assessment (Table A.2)
3. Calculations for hypothetical future receptors include exposure to soil via ingestion, dermal contact, and inhalation.

TABLE 5.2
HUMAN HEALTH REMEDIAL GOAL OPTIONS (RGOs) BY RECEPTOR
SUBSURFACE SOIL (0-10 FT)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Medium and Receptor	Constituent of Concern	Exposure Point Concentration[1]	Concentration at Target Cancer Risk (ppm)			Concentration at Target Hazard Quotient (ppm)[2]		
			1.00E-04	1.00E-05	1.00E-06	3	1	0.1
SUBSURFACE SOIL [3,4]								
Future On-Site Trespasser	Benzo(a)anthracene	1.30E+02	2.28E+03	2.28E+02	2.28E+01	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.28E+02	2.28E+01	2.28E+00	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.28E+03	2.28E+02	2.28E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.28E+02	2.28E+01	2.28E+00	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	2.28E+03	2.28E+02	2.28E+01	NC	NC	NC
Future Commercial/ Industrial Worker	Benzo(a)anthracene	1.30E+02	2.36E+02	2.36E+01	2.36E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.36E+01	2.36E+00	2.36E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.36E+02	2.36E+01	2.36E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	2.36E+03	2.36E+02	2.36E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.36E+01	2.36E+00	2.36E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	2.36E+02	2.36E+01	2.36E+00	NC	NC	NC
	Arsenic	1.15E+01	3.32E+02	3.32E+01	3.32E+00	1.84E+03	6.13E+02	6.13E+01
Future Construction Worker	Benzo(a)anthracene	1.30E+02	2.75E+03	2.75E+02	2.75E+01	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.75E+02	2.75E+01	2.75E+00	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.75E+03	2.75E+02	2.75E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.75E+02	2.75E+01	2.75E+00	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	2.75E+03	2.75E+02	2.75E+01	NC	NC	NC
Future Resident: Adult	Benzo(a)anthracene	1.30E+02	1.76E+02	1.76E+01	1.76E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	1.76E+01	1.76E+00	1.76E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	1.76E+02	1.76E+01	1.76E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	1.76E+03	1.76E+02	1.76E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	1.76E+01	1.76E+00	1.76E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	1.76E+02	1.76E+01	1.76E+00	NC	NC	NC
	Arsenic	1.15E+01	2.47E+02	2.47E+01	2.47E+00	1.31E+03	4.38E+02	4.38E+01
	Benzene	2.01E+00	8.88E+01	8.88E+00	8.88E-01	1.31E+04	4.38E+03	4.38E+02

TABLE 5.2
HUMAN HEALTH REMEDIAL GOAL OPTIONS (RGOs) BY RECEPTOR
SUBSURFACE SOIL (0-10 FT)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Medium and Receptor	Constituent of Concern	Exposure Point Concentration[1]	Concentration at Target Cancer Risk (ppm)			Concentration at Target Hazard Quotient (ppm)[2]		
			1.00E-04	1.00E-05	1.00E-06	3	1	0.1
SUBSURFACE SOIL [3,4]								
Future Resident: Child	Benzo(a)anthracene	1.30E+02	1.71E+02	1.71E+01	1.71E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	1.71E+01	1.71E+00	1.71E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	1.71E+02	1.71E+01	1.71E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	1.71E+03	1.71E+02	1.71E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	1.71E+01	1.71E+00	1.71E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	1.71E+02	1.71E+01	1.71E+00	NC	NC	NC
	Aroclor-1254	4.36E-01	7.27E+01	7.27E+00	7.27E-01	9.39E+00	3.13E+00	3.13E-01
	Arsenic	1.15E+01	1.18E+02	1.18E+01	1.18E+00	1.41E+02	4.69E+01	4.69E+00
	Benzene	2.01E+00	1.00E+02	1.00E+01	1.00E+00	1.41E+03	4.69E+02	4.69E+01
Future Recreator: Adult	Benzo(a)anthracene	1.30E+02	6.15E+02	6.15E+01	6.15E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	6.15E+01	6.15E+00	6.15E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	6.15E+02	6.15E+01	6.15E+00	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	6.15E+01	6.15E+00	6.15E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	6.15E+02	6.15E+01	6.15E+00	NC	NC	NC
	Arsenic	1.15E+01	8.67E+02	8.67E+01	8.67E+00	4.60E+03	1.53E+03	1.53E+02
Future Recreator: Child	Benzo(a)anthracene	1.30E+02	5.99E+02	5.99E+01	5.99E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	5.99E+01	5.99E+00	5.99E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	5.99E+02	5.99E+01	5.99E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	5.99E+03	5.99E+02	5.99E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	5.99E+01	5.99E+00	5.99E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	5.99E+02	5.99E+01	5.99E+00	NC	NC	NC
	Arsenic	1.15E+01	4.14E+02	4.14E+01	4.14E+00	4.93E+02	1.64E+02	1.64E+01

Note:
-- indicates that the analyte is not a preliminary COC for the media/receptor of concern.
NC Not calculated, no criteria or toxicity information available.
1. Exposure point concentration currently estimated for this medium
2. The RGO was derived using the following simplified equation:
RGO = EPC x target HI/derived HI
where: target HI = 1.0
derived HI = total receptor HI derived in the risk assessment (Table A.2)
3. Calculations for current trespassers include inhalation of volatiles generated from soil.
4. Calculations for hypothetical future receptors include exposure to soil via ingestion, dermal contact, and inhalation.

SECTION 6
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APPENDIX A

STATISTICAL INFORMATION

APPENDIX A.1

STATISTICAL DATA SUMMARY

TABLE A.1
STATISTICAL SUMMARY (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

CLASS	ANALYTE	UNITS	# OF DETECTS	# OF SAMPLES	% DETECTS	SQL RANGE	MIN	MAX	MEAN	MEDIAN	STDEV	DIST	EPC
Volatiles	Acetone	ug/kg	7	42	17%	1.00E-02 - 1.40E+04	5.00E+00	2.50E+04	1.90E+03	6.00E+00	5.14E+03	np	3.38E+03
	Ethylbenzene	ug/kg	1	42	2%	1.00E+01 - 1.40E+03	5.00E+00	2.70E+04	7.16E+02	6.00E+00	4.16E+03	np	1.99E+03
	Methylene Chloride	ug/kg	3	37	8%	1.00E+01 - 1.20E+02	4.00E+00	1.40E+02	1.11E+01	6.00E+00	2.36E+01	np	1.83E+01
	Xylenes (total)	ug/kg	1	42	2%	1.00E+01 - 1.40E+03	5.00E+00	5.60E+04	1.41E+03	6.00E+00	8.63E+03	np	4.06E+03
Semi-vols	bis(2-ethylhexyl)Phthalate	ug/kg	30	37	81%	3.60E+02 - 4.90E+02	6.60E+01	1.00E+03	2.49E+02	1.90E+02	2.06E+02	np	3.06E+02
	Butylbenzylphthalate	ug/kg	2	2	100%	NA - NA	8.70E+01	9.20E+01	8.95E+01	8.95E+01	3.54E+00	none	9.20E+01
	Carbazole	ug/kg	25	42	60%	3.60E+02 - 4.80E+02	4.60E+01	5.40E+04	1.70E+03	1.90E+02	8.30E+03	np	4.25E+03
	Dibenzofuran	ug/kg	19	42	45%	3.60E+02 - 3.60E+03	6.10E+01	8.20E+04	2.31E+03	1.98E+02	1.26E+04	np	6.18E+03
PAHs	2-Methylnaphthalene	ug/kg	19	52	37%	3.60E+02 - 2.00E+04	5.50E+01	8.70E+04	2.27E+03	1.98E+02	1.21E+04	np	5.44E+03
	Acenaphthene	ug/kg	31	52	60%	3.60E+02 - 3.60E+03	4.40E+01	1.00E+05	2.46E+03	2.00E+02	1.38E+04	np	6.16E+03
	Acenaphthylene	ug/kg	5	40	13%	3.60E+02 - 7.50E+02	5.30E+01	8.10E+02	2.24E+02	1.92E+02	1.23E+02	np	2.60E+02
	Anthracene	ug/kg	41	52	79%	3.60E+02 - 4.80E+02	4.80E+01	1.90E+05	4.69E+03	2.15E+02	2.63E+04	np	1.20E+04
	Benzo(a)Anthracene	ug/kg	47	52	90%	3.80E+02 - 4.80E+02	4.30E+01	9.60E+04	5.14E+03	7.30E+02	1.49E+04	logn	8.92E+03
	Benzo(a)pyrene	ug/kg	47	52	90%	3.80E+02 - 4.80E+02	5.50E+01	1.00E+05	5.16E+03	6.75E+02	1.53E+04	logn	8.09E+03
	Benzo(b)fluoranthene	ug/kg	50	52	96%	3.80E+02 - 4.10E+02	4.90E+01	1.30E+05	6.79E+03	8.95E+02	1.98E+04	logn	1.34E+04
	Benzo(g,h,i)perylene	ug/kg	44	52	85%	3.80E+02 - 4.80E+02	6.50E+01	4.10E+04	2.46E+03	3.25E+02	6.82E+03	np	4.20E+03
	Benzo(k)fluoranthene	ug/kg	43	52	83%	3.80E+02 - 4.80E+02	8.40E+01	5.90E+04	2.62E+03	2.85E+02	8.60E+03	np	4.73E+03
	Chrysene	ug/kg	48	52	92%	3.80E+02 - 4.10E+02	4.50E+01	9.80E+04	5.40E+03	6.85E+02	1.54E+04	logn	9.98E+03
	Dibenz(a,h)anthracene	ug/kg	29	52	56%	3.60E+02 - 4.90E+02	5.20E+01	1.20E+04	7.72E+02	1.90E+02	1.94E+03	np	1.25E+03
	Fluoranthene	ug/kg	51	52	98%	4.80E+02 - 4.80E+02	4.90E+01	2.60E+05	1.17E+04	1.35E+03	3.80E+04	logn	2.57E+04
	Fluorene	ug/kg	28	52	54%	3.60E+02 - 3.60E+03	5.70E+01	1.10E+05	2.65E+03	1.98E+02	1.52E+04	np	6.86E+03
	Indeno(1,2,3-cd)pyrene	ug/kg	43	52	83%	3.80E+02 - 4.80E+02	8.10E+01	4.30E+04	2.62E+03	3.60E+02	7.27E+03	np	4.35E+03
	Naphthalene	ug/kg	28	52	54%	8.70E+01 - 2.00E+04	3.90E+01	1.50E+05	3.63E+03	1.98E+02	2.08E+04	np	9.52E+03
	Phenanthrene	ug/kg	50	52	96%	3.80E+02 - 3.90E+02	6.20E+01	3.50E+05	1.08E+04	1.05E+03	4.89E+04	logn	1.39E+04
	Pyrene	ug/kg	49	52	94%	3.80E+02 - 4.80E+02	5.20E+01	1.80E+05	9.59E+03	1.25E+03	2.80E+04	logn	1.99E+04
Metals	Arsenic	mg/kg	52	52	100%	NA - NA	3.00E+00	4.07E+01	9.88E+00	9.45E+00	4.81E+00	np	1.10E+01
	Barium	mg/kg	52	52	100%	NA - NA	2.22E+01	2.22E+03	9.36E+01	4.53E+01	3.02E+02	np	1.77E+02
	Cadmium	mg/kg	45	52	87%	2.30E-01 - 1.10E+00	1.15E-01	1.56E+01	1.35E+00	5.85E-01	2.74E+00	np	2.03E+00
	Chromium	mg/kg	52	52	100%	NA - NA	6.30E+00	3.19E+02	3.00E+01	1.70E+01	5.02E+01	np	4.23E+01
	Lead	mg/kg	52	52	100%	NA - NA	1.24E+01	1.61E+03	9.18E+01	3.42E+01	2.26E+02	np	1.57E+02
	Mercury	mg/kg	36	50	72%	6.00E-02 - 7.00E-02	3.00E-02	2.00E+00	2.33E-01	1.10E-01	3.46E-01	np	3.19E-01
	Selenium	mg/kg	1	51	2%	8.60E-01 - 1.20E+00	4.30E-01	1.60E+00	5.00E-01	4.65E-01	1.62E-01	np	5.43E-01
	Silver	mg/kg	7	52	13%	2.10E-01 - 2.30E+00	1.05E-01	4.60E+00	3.84E-01	1.20E-01	7.84E-01	np	5.63E-01
Pest/PCBs	4,4'-DDD	ug/kg	14	36	39%	3.60E+00 - 3.60E+01	1.70E-01	6.20E+01	6.70E+00	1.95E+00	1.34E+01	np	1.05E+01
	4,4'-DDE	ug/kg	30	37	81%	3.70E+00 - 2.00E+01	3.30E-01	2.80E+01	4.49E+00	1.85E+00	6.01E+00	np	6.11E+00
	4,4'-DDT	ug/kg	23	41	56%	3.70E+00 - 7.70E+01	4.80E-01	1.20E+02	1.16E+01	2.80E+00	2.28E+01	logn	1.87E+01
	alpha-BHC	ug/kg	1	1	100%	NA - NA	3.20E-01	3.20E-01	3.20E-01	3.20E-01	NaN	none	3.20E-01
	alpha-Chlordane	ug/kg	31	42	74%	1.90E+00 - 3.80E+01	2.20E-01	7.70E+01	5.45E+00	1.10E+00	1.23E+01	logn	8.97E+00
	Aroclor-1254	ug/kg	13	42	31%	3.60E+01 - 7.70E+02	1.30E+01	4.40E+03	2.03E+02	2.48E+01	6.76E+02	np	4.11E+02
	Dieldrin	ug/kg	34	42	81%	3.80E+00 - 7.60E+01	1.10E-01	1.40E+02	8.74E+00	1.92E+00	2.25E+01	logn	1.69E+01
	Endosulfan I	ug/kg	8	42	19%	1.80E+00 - 3.80E+01	6.70E-02	4.80E+01	5.28E+00	1.00E+00	8.91E+00	np	7.73E+00
	Endosulfan II	ug/kg	18	35	51%	3.60E+00 - 4.90E+00	2.20E-01	1.00E+01	2.71E+00	1.90E+00	2.40E+00	np	3.39E+00
	Endrin	ug/kg	2	2	100%	NA - NA	6.60E-01	8.60E-01	7.60E-01	7.60E-01	1.41E-01	none	8.60E-01
	gamma-Chlordane	ug/kg	17	30	57%	1.80E+00 - 2.40E+00	1.60E-01	8.20E+00	1.15E+00	9.50E-01	1.44E+00	np	1.63E+00
	Heptachlor	ug/kg	1	2	50%	1.90E-01 - 1.90E-01	9.50E-02	2.30E-01	1.62E-01	1.62E-01	9.55E-02	none	2.30E-01
	Methoxychlor	ug/kg	29	39	74%	1.60E+01 - 1.00E+02	1.50E+00	1.50E+02	2.52E+01	1.00E+01	3.42E+01	logn	3.81E+01
Misc	Total Cyanide	mg/kg	19	52	37%	8.00E-02 - 9.90E-01	4.00E-02	4.60E+00	3.21E-01	2.70E-01	6.19E-01	np	4.92E-01

TABLE A.2
STATISTICAL SUMMARY - MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

CLASS	ANALYTE	UNITS	# OF DETECTS	# OF SAMPS	% DETECTS	SQL RANGE	MIN	MAX	MEAN	MEDIAN	STDEV	DIST	EPC
Volatiles	1,1,2,2-Tetrachloroethane	ug/kg	1	1	100%	NA - NA	3.00E+00	3.00E+00	3.00E+00	3.00E+00	Na	none	3.00E+00
	1,1-Dichloroethene	ug/kg	1	122	1%	1.00E+01 - 1.70E+03	5.00E+00	8.50E+03	1.85E+02	6.00E+00	8.01E+02	np	3.14E+02
	2-Butanone	ug/kg	2	79	3%	1.00E+01 - 1.20E+01	5.00E+00	1.20E+01	5.88E+00	5.50E+00	1.03E+00	np	6.11E+00
	Acetone	ug/kg	49	123	40%	1.00E+01 - 1.40E+04	5.00E+00	2.50E+04	1.37E+03	6.00E+00	3.49E+03	np	1.88E+03
	Benzene	ug/kg	11	125	9%	1.00E+01 - 1.50E+04	3.00E+00	5.70E+04	1.05E+03	6.00E+00	5.92E+03	np	2.01E+03
	Chlorobenzene	ug/kg	1	122	1%	1.00E+01 - 1.70E+03	5.00E+00	8.00E+03	1.81E+02	6.00E+00	7.58E+02	np	3.06E+02
	Chloroform	ug/kg	6	6	100%	NA - NA	3.00E+00	8.00E+00	4.00E+00	3.00E+00	2.00E+00	np	5.50E+00
	Ethylbenzene	ug/kg	19	125	15%	1.00E+01 - 1.60E+03	3.00E+00	1.20E+05	2.28E+03	6.00E+00	1.17E+04	np	4.14E+03
	Methylene Chloride	ug/kg	7	104	7%	9.00E+00 - 1.40E+02	4.00E+00	1.40E+02	1.39E+01	6.00E+00	2.06E+01	np	1.72E+01
	Styrene	ug/kg	5	125	4%	1.00E+01 - 1.50E+04	2.00E+00	2.60E+04	6.14E+02	6.00E+00	2.94E+03	np	1.08E+03
	Tetrachloroethene	ug/kg	2	2	100%	NA - NA	2.00E+00	2.00E+00	2.00E+00	2.00E+00	0.00E+00	none	2.00E+00
	Toluene	ug/kg	11	125	9%	1.00E+01 - 1.50E+04	4.00E+00	1.10E+05	1.85E+03	6.00E+00	1.17E+04	np	3.66E+03
	Trichloroethene	ug/kg	1	122	1%	1.00E+01 - 1.70E+03	5.00E+00	7.90E+03	1.80E+02	6.00E+00	7.50E+02	np	2.99E+02
	Xylenes (total)	ug/kg	22	125	18%	1.00E+01 - 1.60E+03	3.00E+00	4.30E+05	5.94E+03	6.00E+00	3.99E+04	np	1.28E+04
Semi-vols	bis(2-ethylhexyl)Phthalate	ug/kg	34	43	79%	3.60E+02 - 4.90E+02	6.10E+01	1.00E+03	2.44E+02	1.90E+02	2.04E+02	np	2.93E+02
	Butylbenzylphthalate	ug/kg	2	2	100%	NA - NA	8.70E+01	9.20E+01	8.95E+01	8.95E+01	3.54E+00	none	9.20E+01
	Carbazole	ug/kg	42	63	67%	3.60E+02 - 6.60E+03	4.30E+01	2.20E+05	9.08E+03	2.00E+02	3.17E+04	np	1.62E+04
	Dibenzofuran	ug/kg	35	63	56%	3.60E+02 - 3.60E+03	4.60E+01	1.50E+05	8.36E+03	2.00E+02	2.50E+04	np	1.35E+04
PAHs	2-Methylnaphthalene	ug/kg	81	147	55%	3.60E+02 - 1.70E+05	3.70E+01	3.50E+06	6.29E+04	2.40E+02	3.19E+05	np	1.10E+05
	Acenaphthene	ug/kg	104	147	71%	3.60E+02 - 3.60E+03	4.40E+01	1.80E+06	5.13E+04	3.20E+02	2.02E+05	np	8.36E+04
	Acenaphthylene	ug/kg	17	134	13%	3.60E+02 - 7.60E+04	5.00E+01	8.10E+04	3.82E+03	2.12E+02	9.75E+03	np	5.38E+03
	Anthracene	ug/kg	122	147	83%	3.60E+02 - 6.00E+05	4.60E+01	2.40E+06	6.00E+04	5.70E+02	2.80E+05	np	9.65E+04
	Benzo(a)Anthracene	ug/kg	136	147	93%	3.80E+02 - 4.80E+02	4.30E+01	2.80E+06	7.85E+04	1.30E+03	3.36E+05	np	1.30E+05
	Benzo(a)pyrene	ug/kg	136	147	93%	3.80E+02 - 6.00E+05	5.50E+01	2.40E+06	7.15E+04	1.20E+03	2.92E+05	np	1.16E+05
	Benzo(b)fluoranthene	ug/kg	141	147	96%	3.80E+02 - 6.00E+05	4.30E+01	2.60E+06	8.29E+04	1.60E+03	3.18E+05	np	1.26E+05
	Benzo(g,h,i)perylene	ug/kg	129	147	88%	3.80E+02 - 6.00E+05	4.30E+01	9.60E+05	3.18E+04	6.40E+02	1.23E+05	np	5.09E+04
	Benzo(k)fluoranthene	ug/kg	129	147	88%	3.80E+02 - 6.00E+05	4.50E+01	1.40E+06	3.79E+04	5.70E+02	1.64E+05	np	6.34E+04
	Chrysene	ug/kg	140	147	95%	3.80E+02 - 4.20E+02	4.20E+01	3.90E+06	8.94E+04	1.30E+03	4.11E+05	np	1.49E+05
	Dibenz(a,h)anthracene	ug/kg	81	144	56%	3.60E+02 - 1.90E+05	4.50E+01	2.10E+05	9.59E+03	2.15E+02	3.07E+04	np	1.41E+04
	Fluoranthene	ug/kg	144	147	98%	4.00E+02 - 4.80E+02	4.90E+01	6.70E+06	1.84E+05	2.80E+03	7.92E+05	np	3.13E+05
	Fluorene	ug/kg	102	147	69%	3.60E+02 - 3.60E+03	4.30E+01	1.00E+06	4.34E+04	3.40E+02	1.50E+05	np	6.61E+04
	Indeno(1,2,3-cd)pyrene	ug/kg	126	147	86%	3.80E+02 - 6.00E+05	4.20E+01	9.00E+05	3.20E+04	6.30E+02	1.20E+05	np	4.95E+04
	Naphthalene	ug/kg	99	147	67%	8.70E+01 - 4.50E+04	3.90E+01	2.90E+06	1.02E+05	2.70E+02	3.92E+05	np	1.59E+05
	Phenanthrene	ug/kg	142	147	97%	3.80E+02 - 4.80E+02	4.20E+01	8.10E+06	2.13E+05	2.20E+03	9.55E+05	np	3.46E+05
	Pyrene	ug/kg	142	146	97%	3.80E+02 - 4.80E+02	4.30E+01	5.20E+06	1.55E+05	2.40E+03	6.29E+05	np	2.50E+05

TABLE A.2

STATISTICAL SUMMARY - MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

CLASS	ANALYTE	UNITS	# OF DETECTS	# OF SAMPS	% DETECTS	SQL RANGE			MIN	MAX	MEAN	MEDIAN	STDEV	DIST	EPC
Metals	Arsenic	mg/kg	147	147	100%	NA	-	NA	1.50E-01	8.64E+01	1.05E+01	9.20E+00	8.11E+00	np	1.15E+01
	Barium	mg/kg	147	147	100%	NA	-	NA	9.70E+00	2.22E+03	8.37E+01	5.51E+01	1.86E+02	np	1.12E+02
	Cadmium	mg/kg	121	147	82%	2.20E-01	-	1.20E+00	1.10E-01	3.64E+01	1.70E+00	6.40E-01	4.25E+00	np	2.34E+00
	Chromium	mg/kg	147	147	100%	NA	-	NA	2.10E+00	3.69E+02	3.26E+01	1.90E+01	5.25E+01	np	4.01E+01
	Lead	mg/kg	147	147	100%	NA	-	NA	9.80E+00	1.61E+03	8.59E+01	4.24E+01	1.52E+02	np	1.10E+02
	Mercury	mg/kg	105	141	74%	6.00E-02	-	1.20E-01	3.00E-02	2.30E+00	2.30E-01	1.20E-01	3.47E-01	np	2.76E-01
	Selenium	mg/kg	18	145	12%	8.60E-01	-	1.40E+00	4.30E-01	2.70E+00	6.09E-01	4.75E-01	3.94E-01	np	6.67E-01
	Silver	mg/kg	25	147	17%	2.10E-01	-	2.50E+00	1.05E-01	1.10E+01	5.24E-01	1.20E-01	1.34E+00	np	7.25E-01
Pest/PCBs	4,4'-DDD	ug/kg	18	49	37%	3.60E+00	-	4.40E+01	1.70E-01	6.20E+01	9.33E+00	1.95E+00	1.54E+01	np	1.30E+01
	4,4'-DDE	ug/kg	35	47	74%	3.70E+00	-	2.00E+01	3.30E-01	2.80E+01	4.45E+00	1.95E+00	5.56E+00	np	5.75E+00
	4,4'-DDT	ug/kg	30	57	53%	3.70E+00	-	8.10E+01	4.80E-01	1.20E+02	1.36E+01	3.20E+00	2.17E+01	logn	2.28E+01
	alpha-BHC	ug/kg	1	1	100%	NA	-	NA	3.20E-01	3.20E-01	3.20E-01	3.20E-01	NaN	none	3.20E-01
	alpha-Chlordane	ug/kg	37	58	64%	1.90E+00	-	4.00E+01	2.20E-01	7.70E+01	6.07E+00	1.50E+00	1.14E+01	logn	9.53E+00
	Aroclor-1254	ug/kg	16	62	26%	3.60E+01	-	3.80E+03	1.30E+01	4.40E+03	2.74E+02	5.10E+01	6.49E+02	np	4.36E+02
	Dieldrin	ug/kg	40	58	69%	3.80E+00	-	8.10E+01	1.10E-01	1.40E+02	1.00E+01	2.08E+00	2.07E+01	logn	1.88E+01
	Endosulfan I	ug/kg	10	57	18%	1.80E+00	-	4.00E+01	6.70E-02	4.80E+01	5.60E+00	1.05E+00	8.44E+00	np	7.61E+00
	Endosulfan II	ug/kg	21	50	42%	3.60E+00	-	2.00E+01	2.20E-01	3.00E+01	3.87E+00	1.95E+00	4.78E+00	np	5.00E+00
	Endrin	ug/kg	3	3	100%	NA	-	NA	5.20E-01	8.60E-01	6.80E-01	6.60E-01	1.71E-01	none	8.60E-01
	gamma-Chlordane	ug/kg	20	39	51%	1.80E+00	-	4.00E+00	1.60E-01	8.20E+00	1.23E+00	9.50E-01	1.36E+00	np	1.61E+00
	Heptachlor	ug/kg	1	2	50%	1.90E-01	-	1.90E-01	9.50E-02	2.30E-01	1.62E-01	1.62E-01	9.55E-02	none	2.30E-01
	Methoxychlor	ug/kg	40	56	71%	1.60E+01	-	1.00E+02	1.50E+00	1.50E+02	2.66E+01	1.10E+01	3.15E+01	logn	3.82E+01
Misc	Sulfur (D2015/300.0)	ug/g	12	12	100%	NA	-	NA	2.22E+02	2.33E+03	9.01E+02	6.84E+02	6.65E+02	logn	1.49E+03
	Total Cyanide	mg/kg	52	147	35%	8.00E-02	-	9.90E-01	4.00E-02	4.60E+00	3.37E-01	2.70E-01	5.84E-01	np	4.27E-01
	Total Organic Carbon	mg/kg	12	12	100%	NA	-	NA	4.00E+03	2.10E+04	1.19E+04	1.09E+04	4.89E+03	logn	1.60E+04

TABLE A.3
STATISTICAL SUMMARY - MIXED SURFACE AND SUBSURFACE SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

CLASS	ANALYTE	UNITS	# OF DETECTS	# OF SAMPS	% DETECTS	SQL RANGE	MIN	MAX	MEAN	MEDIAN	STDEV	DIST	EPC
Volatiles	1,1,2,2-Tetrachloroethane	ug/kg	1	1	100%	NA - NA	3.00E+00	3.00E+00	3.00E+00	3.00E+00	NA	none	3.00E+00
	1,1-Dichloroethene	ug/kg	1	140	1%	1.00E+01 - 1.70E+03	5.00E+00	8.50E+03	1.93E+02	6.00E+00	7.57E+02	np	3.10E+02
	2-Butanone	ug/kg	4	118	3%	1.00E+01 - 2.10E+02	5.00E+00	3.50E+02	2.01E+01	6.00E+00	3.76E+01	np	2.62E+01
	4-Methyl-2-pentanone	ug/kg	2	87	2%	1.00E+01 - 1.70E+01	5.00E+00	2.50E+01	6.06E+00	6.00E+00	2.12E+00	np	6.52E+00
	Acetone	ug/kg	64	145	44%	1.00E+01 - 1.60E+04	5.00E+00	2.50E+04	1.51E+03	9.00E+00	3.36E+03	np	1.98E+03
	Benzene	ug/kg	18	147	12%	1.00E+01 - 1.50E+04	3.00E+00	5.70E+04	1.57E+03	6.00E+00	6.42E+03	np	2.48E+03
	Chlorobenzene	ug/kg	1	140	1%	1.00E+01 - 1.70E+03	5.00E+00	8.00E+03	1.90E+02	6.00E+00	7.18E+02	np	2.97E+02
	Chloroform	ug/kg	7	93	8%	1.00E+01 - 4.00E+01	3.00E+00	4.10E+01	6.85E+00	6.00E+00	4.82E+00	np	7.72E+00
	Ethylbenzene	ug/kg	28	147	19%	1.00E+01 - 1.60E+03	3.00E+00	1.20E+05	3.24E+03	6.00E+00	1.29E+04	np	5.22E+03
	Methylene Chloride	ug/kg	10	117	9%	9.00E+00 - 1.40E+02	4.00E+00	1.40E+02	1.70E+01	6.00E+00	2.33E+01	np	2.08E+01
	Styrene	ug/kg	7	147	5%	1.00E+01 - 1.60E+04	2.00E+00	2.60E+04	7.81E+02	6.00E+00	2.95E+03	np	1.22E+03
	Tetrachloroethene	ug/kg	2	2	100%	NA - NA	2.00E+00	2.00E+00	2.00E+00	2.00E+00	0.00E+00	none	2.00E+00
	Toluene	ug/kg	18	147	12%	1.00E+01 - 1.50E+04	4.00E+00	1.10E+05	2.30E+03	6.00E+00	1.14E+04	np	3.87E+03
	Trichloroethene	ug/kg	1	140	1%	1.00E+01 - 1.70E+03	5.00E+00	7.90E+03	1.89E+02	6.00E+00	7.10E+02	np	2.94E+02
	Xylenes (total)	ug/kg	31	147	21%	1.00E+01 - 1.60E+03	3.00E+00	4.30E+05	7.78E+03	6.00E+00	3.87E+04	np	1.32E+04
Semi-vols	4-Methylphenol	ug/kg	1	60	2%	3.60E+02 - 1.40E+04	1.80E+02	4.20E+04	1.90E+03	2.00E+02	5.61E+03	np	3.29E+03
	bis(2-ethylhexyl)Phthalate	ug/kg	34	44	77%	3.60E+02 - 7.80E+02	6.10E+01	1.00E+03	2.47E+02	1.90E+02	2.02E+02	np	3.02E+02
	Butylbenzylphthalate	ug/kg	2	2	100%	NA - NA	8.70E+01	9.20E+01	8.95E+01	8.95E+01	3.54E+00	none	9.20E+01
	Carbazole	ug/kg	45	66	68%	3.60E+02 - 6.60E+03	4.30E+01	2.20E+05	9.28E+03	2.00E+02	3.12E+04	np	1.66E+04
	Dibenzofuran	ug/kg	38	66	58%	3.60E+02 - 3.60E+03	4.60E+01	1.50E+05	1.01E+04	2.00E+02	2.93E+04	np	1.64E+04
	Phenol	ug/kg	1	60	2%	3.60E+02 - 1.40E+04	1.80E+02	2.30E+04	1.59E+03	2.00E+02	3.41E+03	np	2.33E+03
PAHs	2-Methylnaphthalene	ug/kg	95	173	55%	3.60E+02 - 1.70E+05	3.70E+01	3.50E+06	6.43E+04	2.40E+02	2.98E+05	np	1.05E+05
	Acenaphthene	ug/kg	120	173	69%	3.60E+02 - 3.60E+03	4.40E+01	1.80E+06	4.96E+04	3.20E+02	1.88E+05	np	7.67E+04
	Acenaphthylene	ug/kg	21	156	13%	3.60E+02 - 7.60E+04	5.00E+01	8.10E+04	3.94E+03	2.15E+02	9.78E+03	np	5.22E+03
	Anthracene	ug/kg	139	173	80%	3.60E+02 - 6.00E+05	4.60E+01	2.40E+06	5.56E+04	5.90E+02	2.59E+05	np	9.54E+04
	Benzo(a)Anthracene	ug/kg	154	173	89%	3.70E+02 - 4.80E+02	4.30E+01	2.80E+06	6.98E+04	1.30E+03	3.10E+05	np	1.12E+05
	Benzo(a)pyrene	ug/kg	151	173	87%	3.70E+02 - 6.00E+05	5.50E+01	2.40E+06	6.32E+04	1.20E+03	2.70E+05	np	9.94E+04
	Benzo(b)fluoranthene	ug/kg	157	173	91%	3.80E+02 - 6.00E+05	4.30E+01	2.60E+06	7.31E+04	1.60E+03	2.95E+05	np	1.11E+05
	Benzo(g,h,i)perylene	ug/kg	141	173	82%	3.70E+02 - 6.00E+05	4.30E+01	9.60E+05	2.90E+04	5.70E+02	1.14E+05	np	4.33E+04
	Benzo(k)fluoranthene	ug/kg	143	173	83%	3.70E+02 - 6.00E+05	4.50E+01	1.40E+06	3.41E+04	5.70E+02	1.52E+05	np	5.39E+04
	Chrysene	ug/kg	158	173	91%	3.80E+02 - 1.60E+05	4.20E+01	3.90E+06	7.93E+04	1.30E+03	3.80E+05	np	1.28E+05
	Dibenz(a,h)anthracene	ug/kg	87	169	51%	3.60E+02 - 1.90E+05	4.50E+01	2.10E+05	1.03E+04	2.15E+02	3.05E+04	np	1.44E+04
	Fluoranthene	ug/kg	165	173	95%	3.90E+02 - 4.80E+02	4.90E+01	6.70E+06	1.66E+05	2.80E+03	7.33E+05	np	2.66E+05
	Fluorene	ug/kg	119	173	69%	3.60E+02 - 3.60E+03	4.30E+01	1.00E+06	4.36E+04	3.50E+02	1.43E+05	np	6.12E+04
	Indeno(1,2,3-cd)pyrene	ug/kg	139	173	80%	3.70E+02 - 6.00E+05	4.20E+01	9.00E+05	2.91E+04	6.20E+02	1.11E+05	np	4.35E+04
	Naphthalene	ug/kg	115	173	66%	8.70E+01 - 4.50E+04	3.90E+01	2.90E+06	1.22E+05	2.90E+02	4.02E+05	np	1.78E+05
	Phenanthrene	ug/kg	166	173	96%	3.80E+02 - 4.80E+02	4.20E+01	8.10E+06	2.01E+05	2.20E+03	8.87E+05	np	3.19E+05
	Pyrene	ug/kg	163	172	95%	3.80E+02 - 4.80E+02	4.30E+01	5.20E+06	1.41E+05	2.40E+03	5.83E+05	np	2.15E+05

TABLE A.3

STATISTICAL SUMMARY - MIXED SURFACE AND SUBSURFACE SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT

2800 SOUTH SACRAMENTO AVENUE SITE

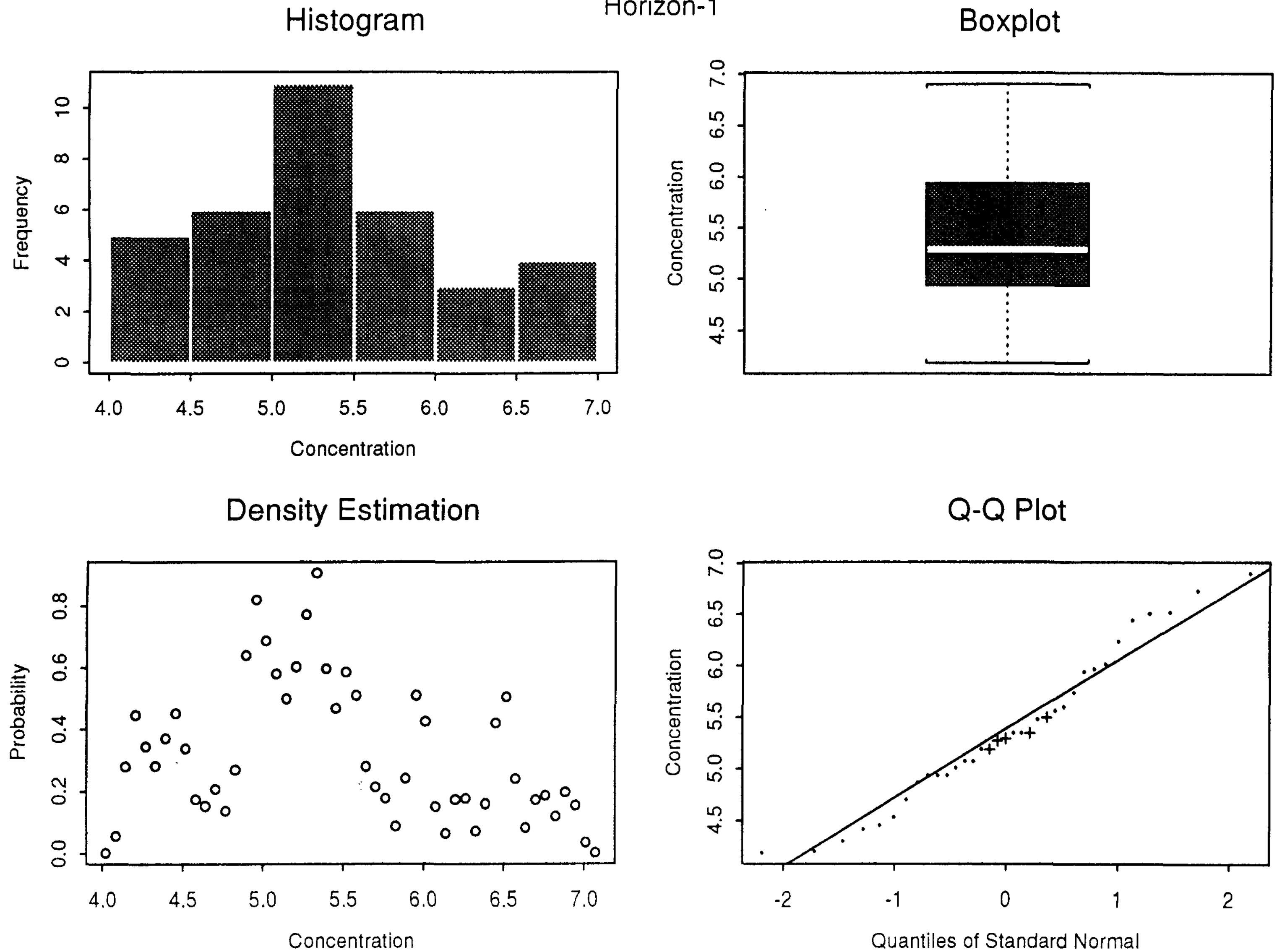
CHICAGO, ILLINOIS

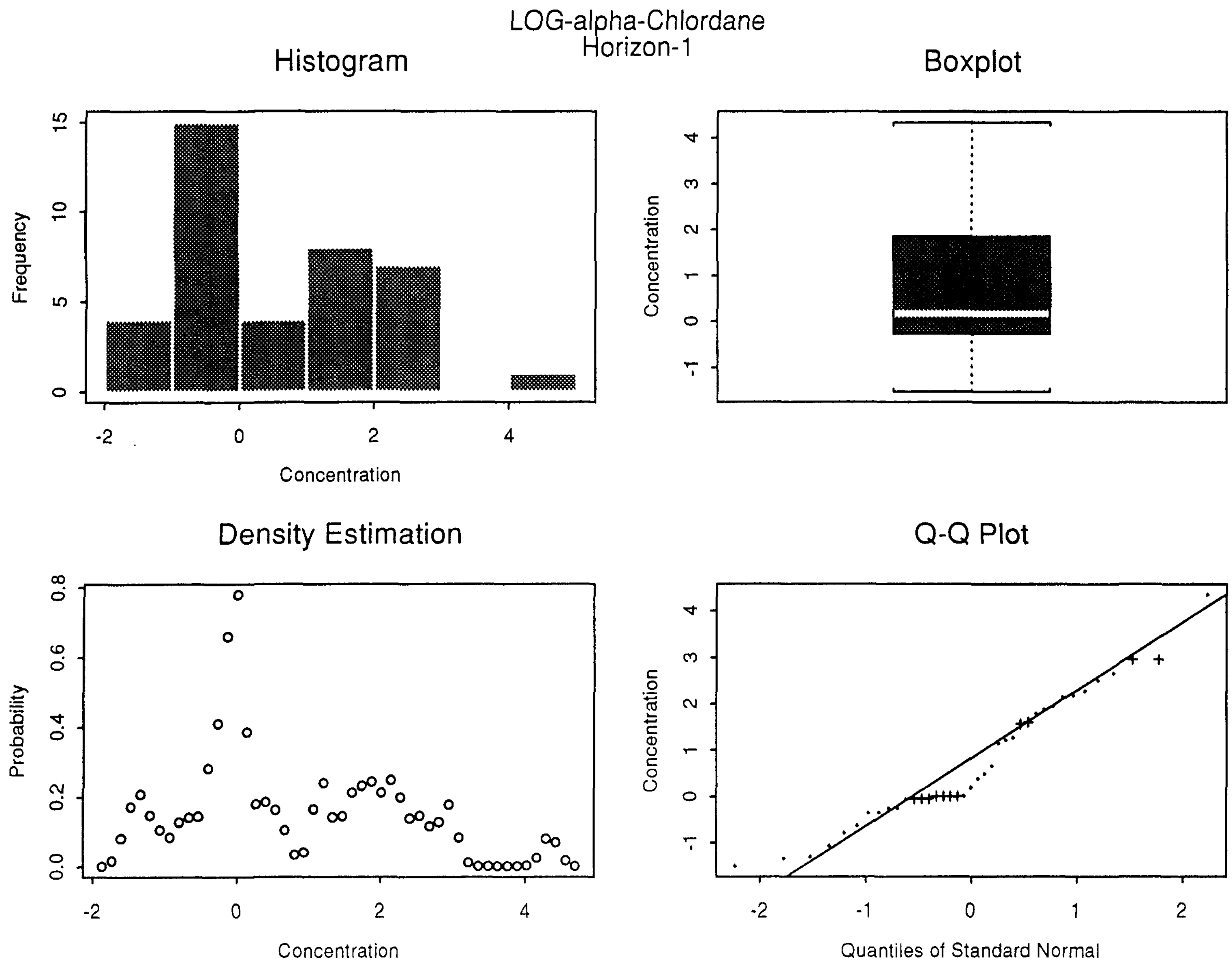
CLASS	ANALYTE	UNITS	# OF DETECTS	# OF SAMPS	% DETECTS	SQL RANGE	MIN	MAX	MEAN	MEDIAN	STDEV	DIST	EPC
Metals	Arsenic	mg/kg	173	173	100%	NA - NA	1.50E-01	1.04E+02	1.09E+01	9.30E+00	1.04E+01	np	1.24E+01
	Barium	mg/kg	173	173	100%	NA - NA	9.00E+00	2.22E+03	8.03E+01	5.39E+01	1.73E+02	np	1.06E+02
	Cadmium	mg/kg	132	173	76%	7.00E-02 - 1.20E+00	3.50E-02	3.64E+01	1.52E+00	5.50E-01	3.96E+00	np	2.06E+00
	Chromium	mg/kg	173	173	100%	NA - NA	2.10E+00	3.69E+02	3.05E+01	1.90E+01	4.87E+01	np	3.72E+01
	Lead	mg/kg	173	173	100%	NA - NA	4.90E+00	2.68E+03	9.25E+01	3.53E+01	2.44E+02	np	1.26E+02
	Mercury	mg/kg	113	164	69%	6.00E-02 - 1.50E-01	3.00E-02	2.71E+01	3.70E-01	1.00E-01	2.13E+00	np	6.94E-01
	Selenium	mg/kg	21	171	12%	8.60E-01 - 1.50E+00	4.30E-01	2.53E+01	7.45E-01	4.80E-01	1.92E+00	np	1.03E+00
	Silver	mg/kg	27	173	16%	2.10E-01 - 2.90E+00	1.05E-01	1.10E+01	4.88E-01	1.20E-01	1.25E+00	np	6.47E-01
Pest/PCBs	4,4'-DDD	ug/kg	19	52	37%	3.60E+00 - 4.40E+01	1.70E-01	6.20E+01	9.29E+00	2.00E+00	1.50E+01	np	1.27E+01
	4,4'-DDE	ug/kg	35	49	71%	3.70E+00 - 2.00E+01	3.30E-01	2.80E+01	4.36E+00	2.00E+00	5.46E+00	np	5.69E+00
	4,4'-DDT	ug/kg	30	60	50%	3.70E+00 - 8.10E+01	4.80E-01	1.20E+02	1.34E+01	3.20E+00	2.12E+01	np	1.81E+01
	alpha-BHC	ug/kg	1	1	100%	NA - NA	3.20E-01	3.20E-01	3.20E-01	3.20E-01	NA	none	3.20E-01
	alpha-Chlordane	ug/kg	38	61	62%	1.90E+00 - 4.00E+01	2.20E-01	7.70E+01	5.97E+00	1.60E+00	1.12E+01	logn	9.17E+00
	Aroclor-1254	ug/kg	16	65	25%	3.60E+01 - 3.80E+03	1.30E+01	4.40E+03	2.65E+02	4.80E+01	6.35E+02	np	3.97E+02
	Dieldrin	ug/kg	40	61	66%	3.80E+00 - 8.10E+01	1.10E-01	1.40E+02	9.90E+00	2.10E+00	2.03E+01	logn	1.81E+01
	Endosulfan I	ug/kg	10	60	17%	1.80E+00 - 4.00E+01	6.70E-02	4.80E+01	5.51E+00	1.05E+00	8.28E+00	np	7.23E+00
	Endosulfan II	ug/kg	22	52	42%	3.60E+00 - 2.00E+01	2.20E-01	3.00E+01	3.81E+00	1.98E+00	4.70E+00	np	4.91E+00
	Endrin	ug/kg	3	3	100%	NA - NA	5.20E-01	8.60E-01	6.80E-01	6.60E-01	1.71E-01	none	8.60E-01
	gamma-Chlordane	ug/kg	20	41	49%	1.80E+00 - 4.00E+00	1.60E-01	8.20E+00	1.22E+00	9.60E-01	1.32E+00	np	1.57E+00
	Heptachlor	ug/kg	1	2	50%	1.90E-01 - 1.90E-01	9.50E-02	2.30E-01	1.62E-01	1.62E-01	9.55E-02	none	2.30E-01
	Methoxychlor	ug/kg	40	58	69%	1.60E+01 - 1.10E+02	1.50E+00	1.50E+02	2.68E+01	1.10E+01	3.13E+01	logn	3.84E+01
Misc	Sulfur (D2015/300.0)	ug/g	14	14	100%	NA - NA	2.22E+02	2.33E+03	9.61E+02	6.84E+02	6.95E+02	logn	1.53E+03
	Total Cyanide	mg/kg	57	173	33%	8.00E-02 - 9.90E-01	4.00E-02	9.50E+00	3.91E-01	2.75E-01	8.85E-01	np	5.17E-01
	Total Organic Carbon	mg/kg	14	14	100%	NA - NA	4.00E+03	2.10E+04	1.22E+04	1.10E+04	4.82E+03	logn	1.58E+04

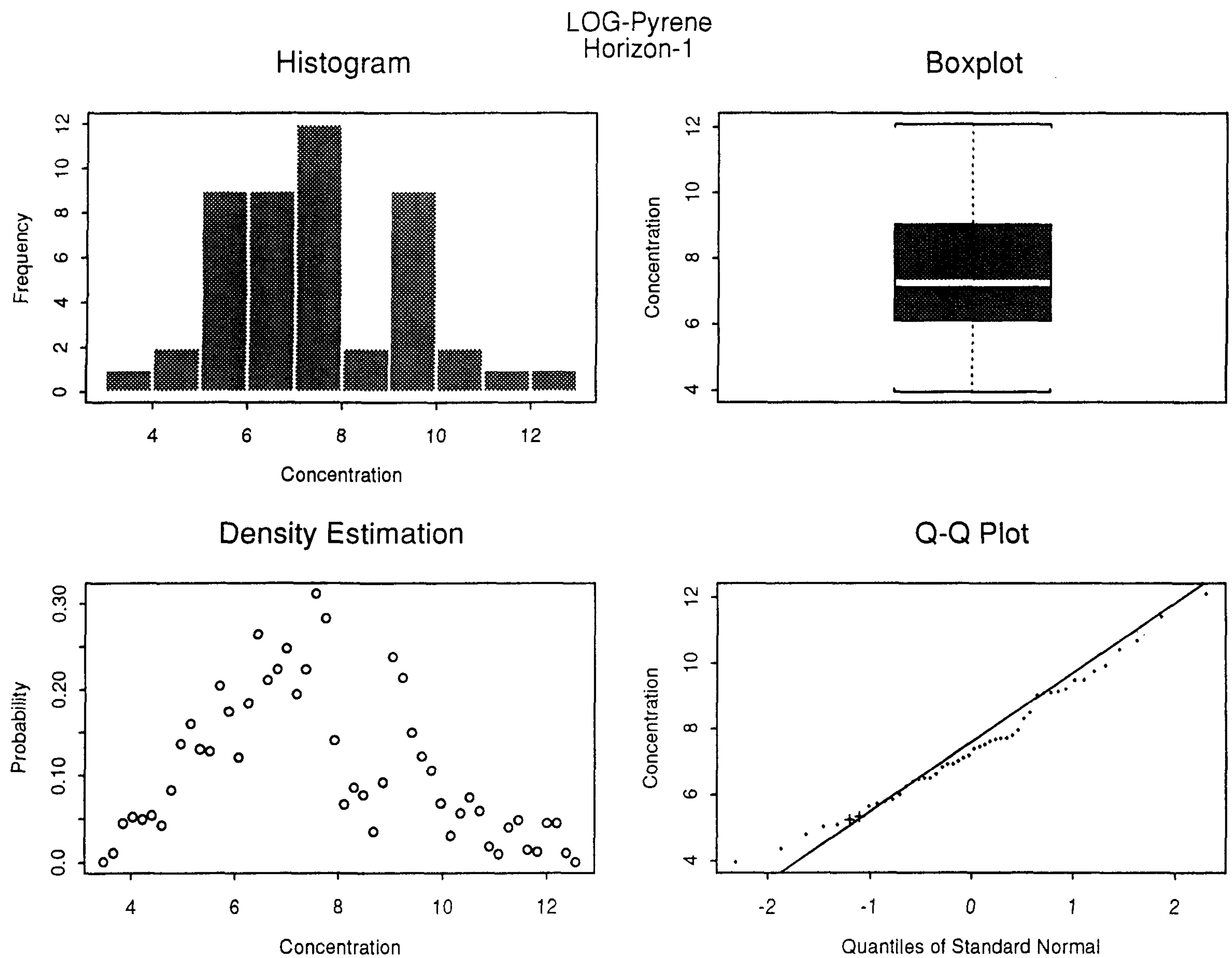
APPENDIX A.2

PLOTS FOR HORIZON 1
(0 - 0.5 FEET)

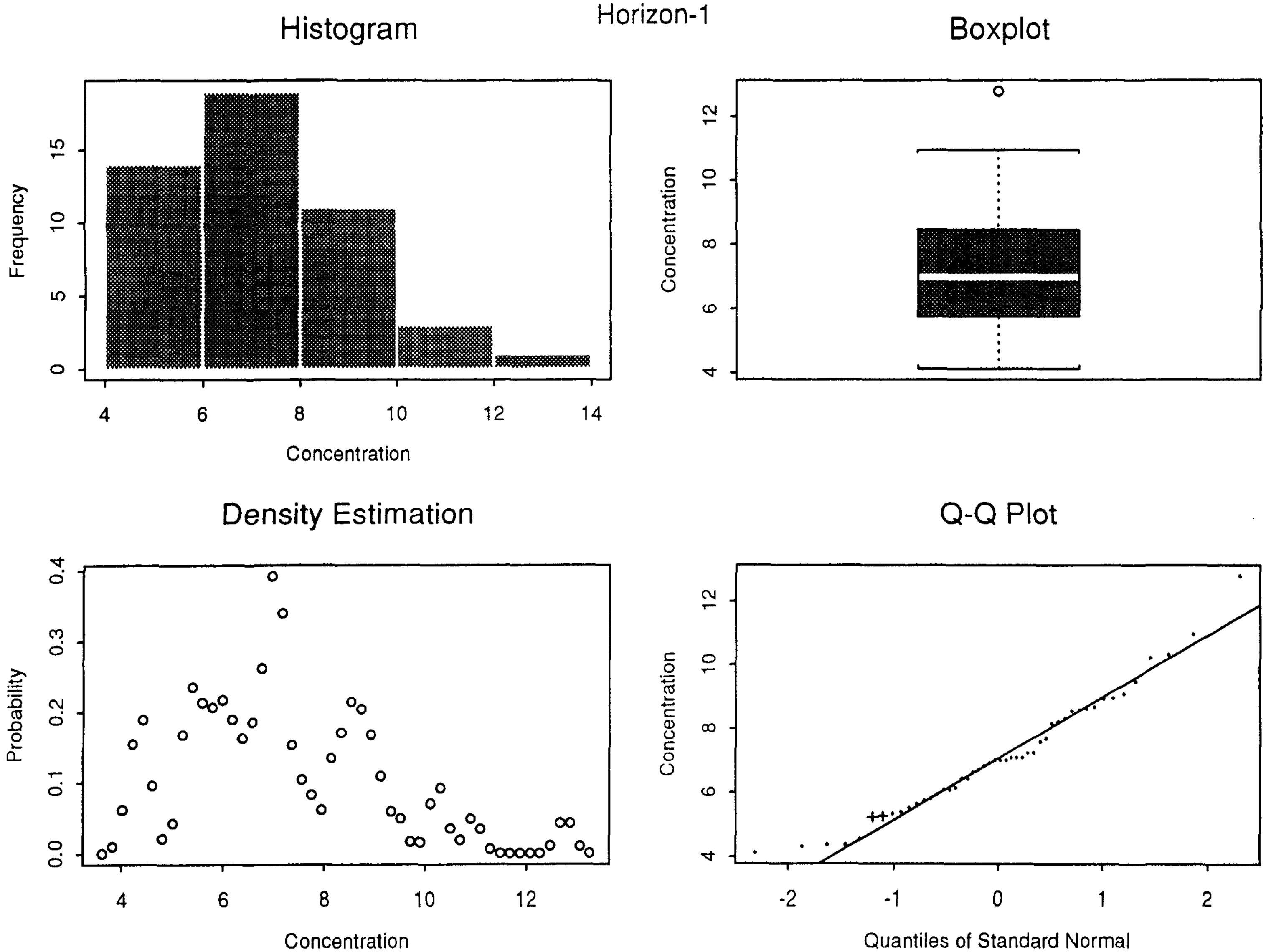
LOG-bis(2-ethylhexyl)Phthalate
Horizon-1



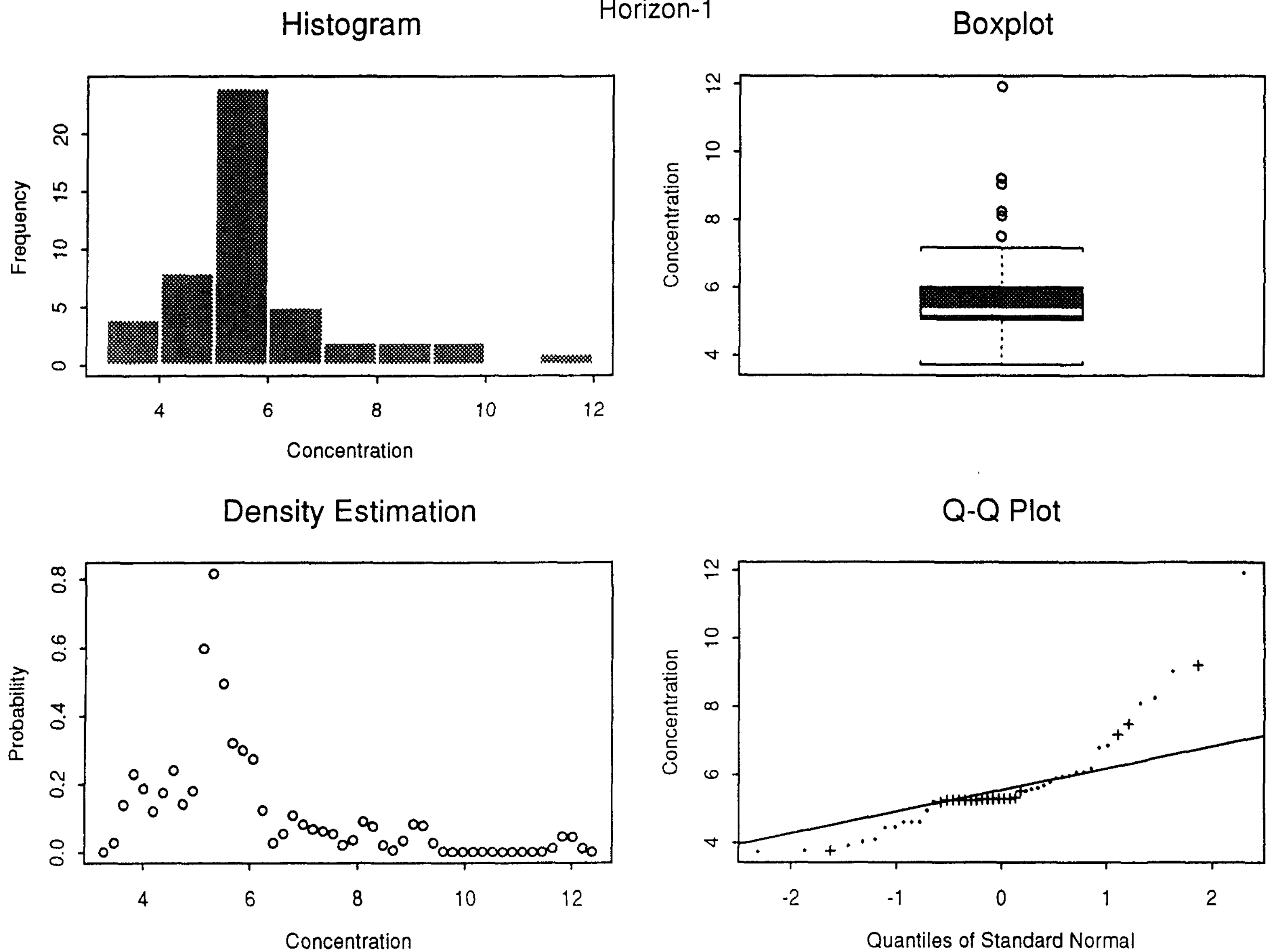

LOG-alpha-Chlordane
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

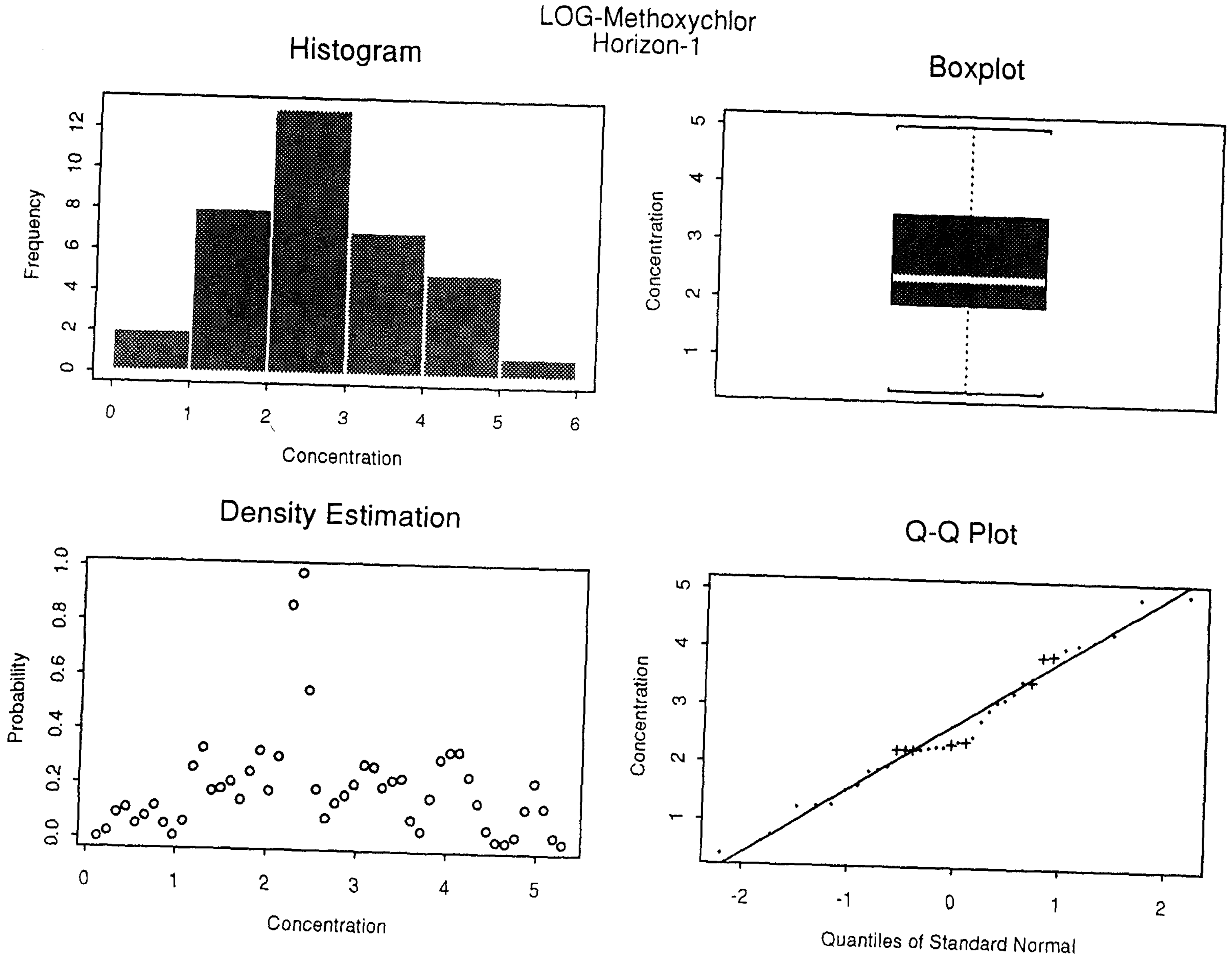

LOG-Pyrene
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

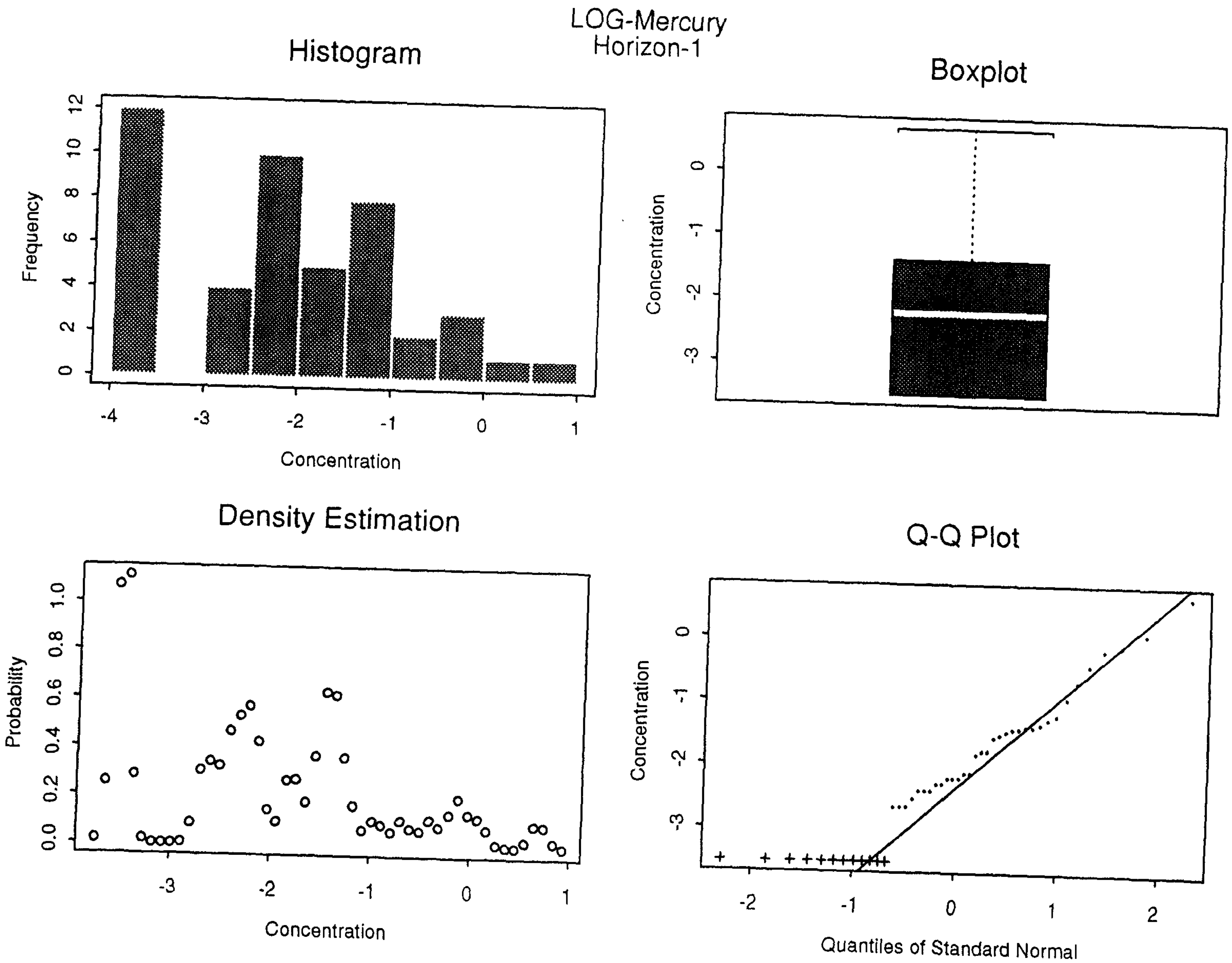
LOG-Phenanthrene
Horizon-1

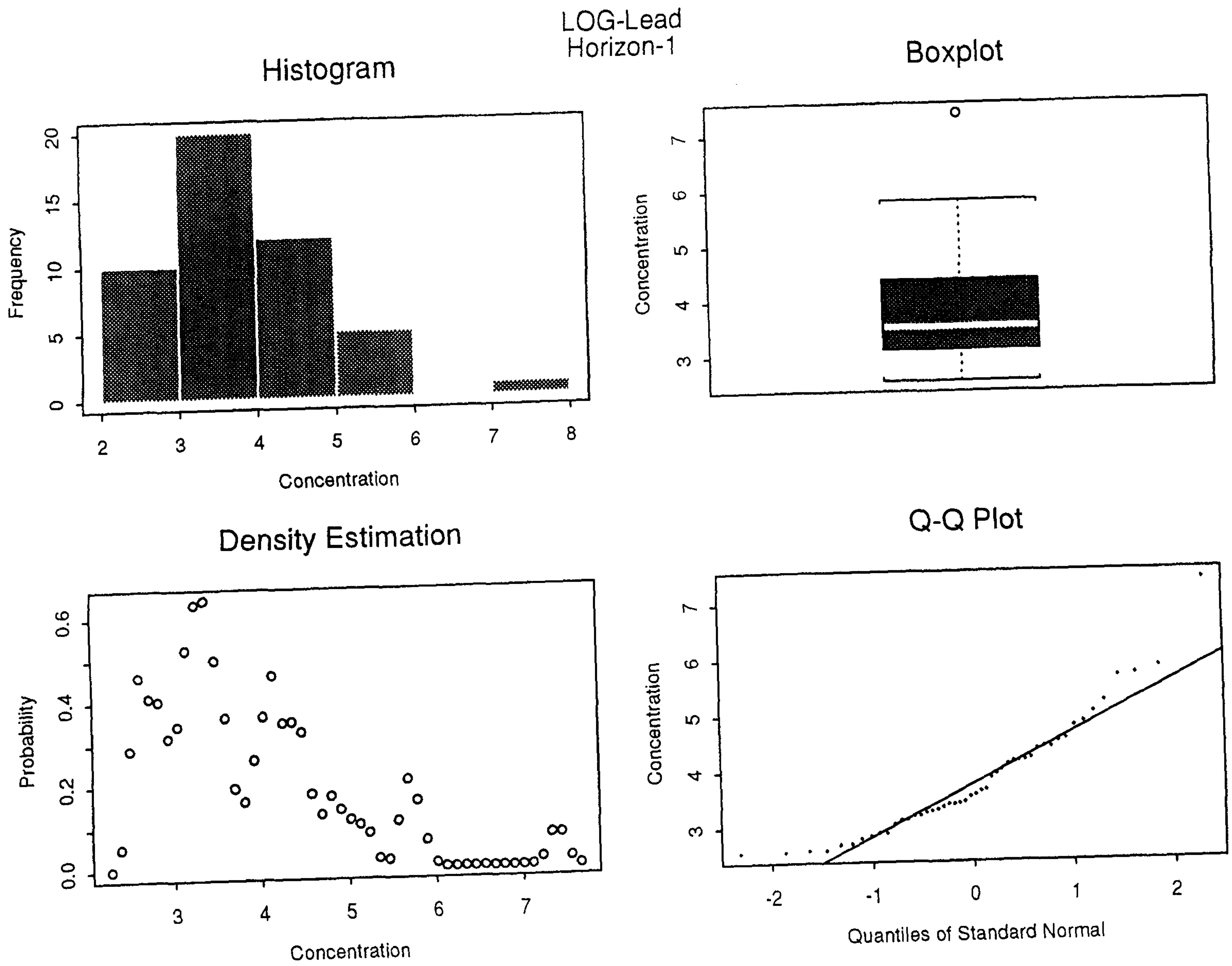


LOG-Naphthalene
Horizon-1



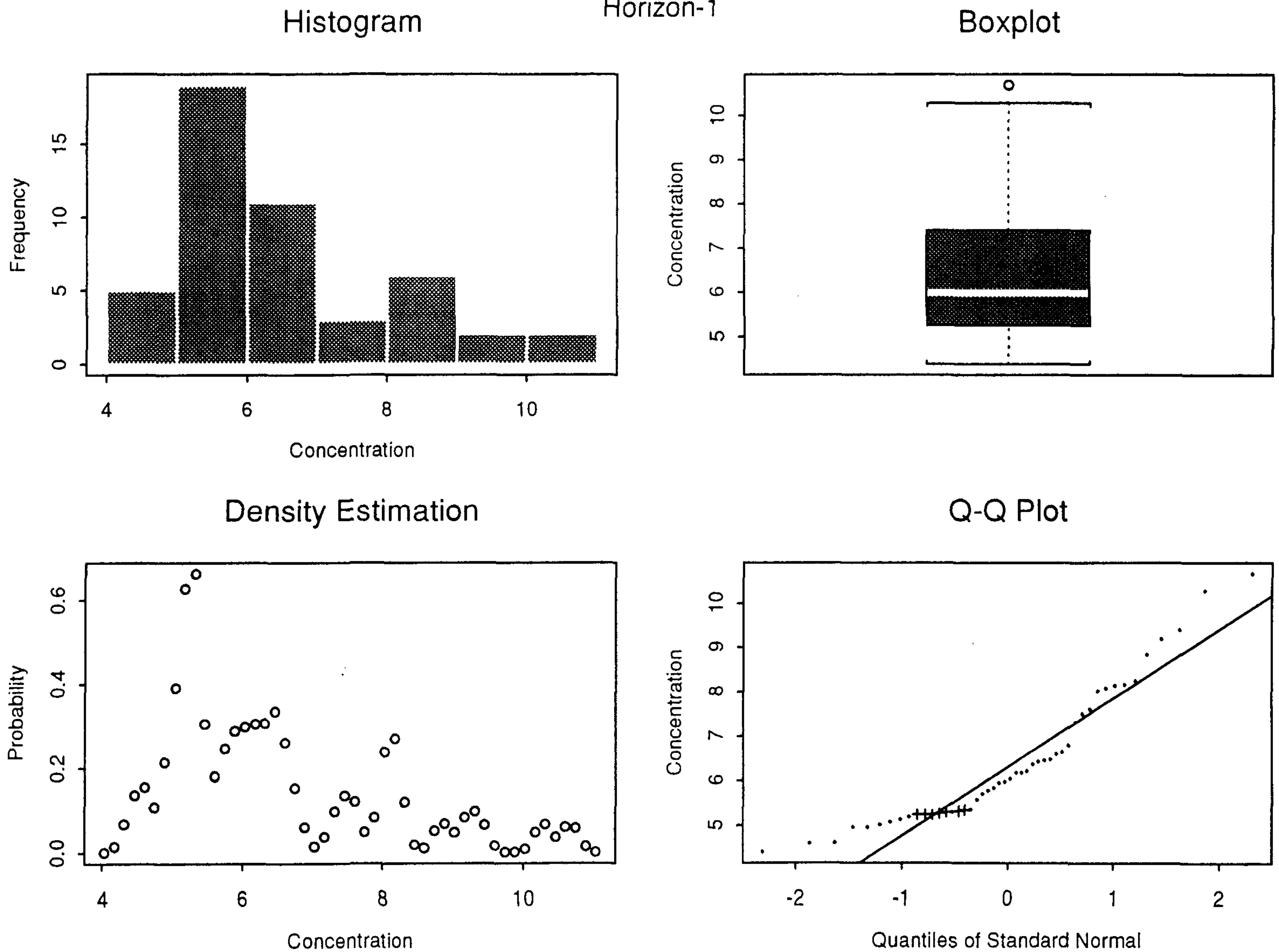

LOG-Methoxychlor
Horizon-1
Histogram
Frequency
0 2 4 6 8 10 12
0 1 2 3 4 5 6
Concentration
Boxplot
Concentration
1 2 3 4 5
Density Estimation
Probability
0.0 0.2 0.4 0.6 0.8 1.0
0 1 2 3 4 5
Concentration
Q-Q Plot
Concentration
1 2 3 4 5
-2 -1 0 1 2
Quantiles of Standard Normal


LOG-Mercury
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

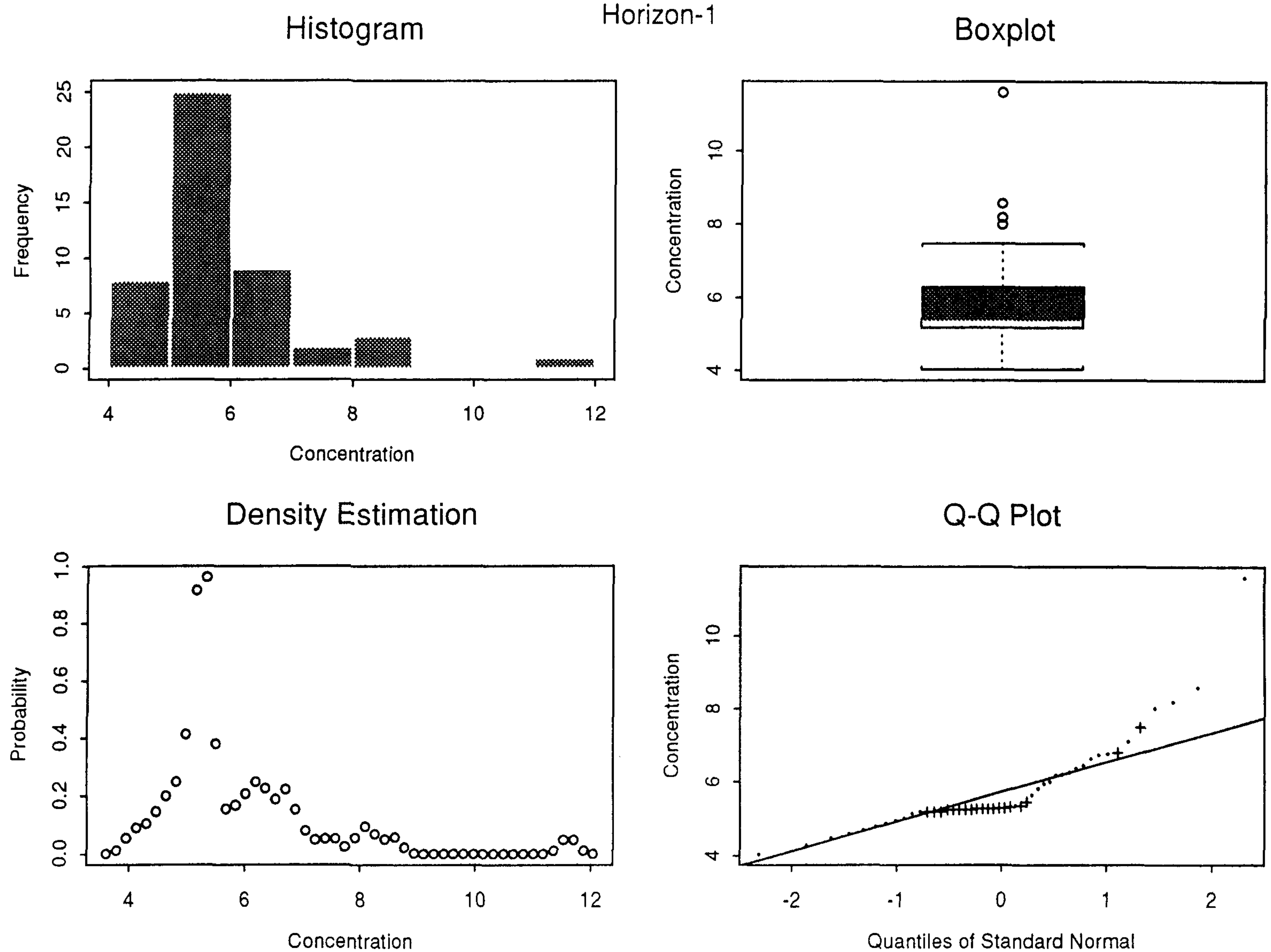


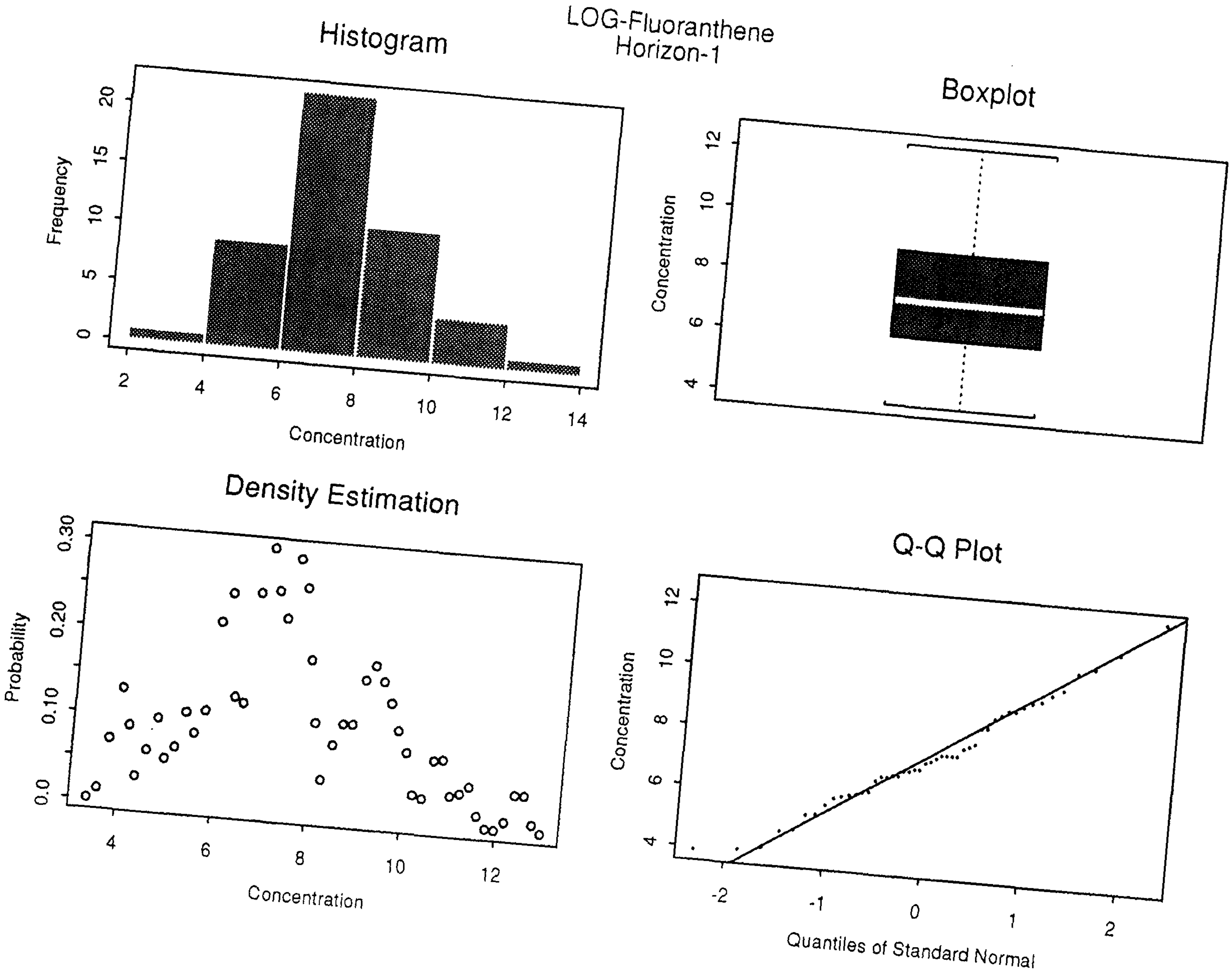
LOG-Lead
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

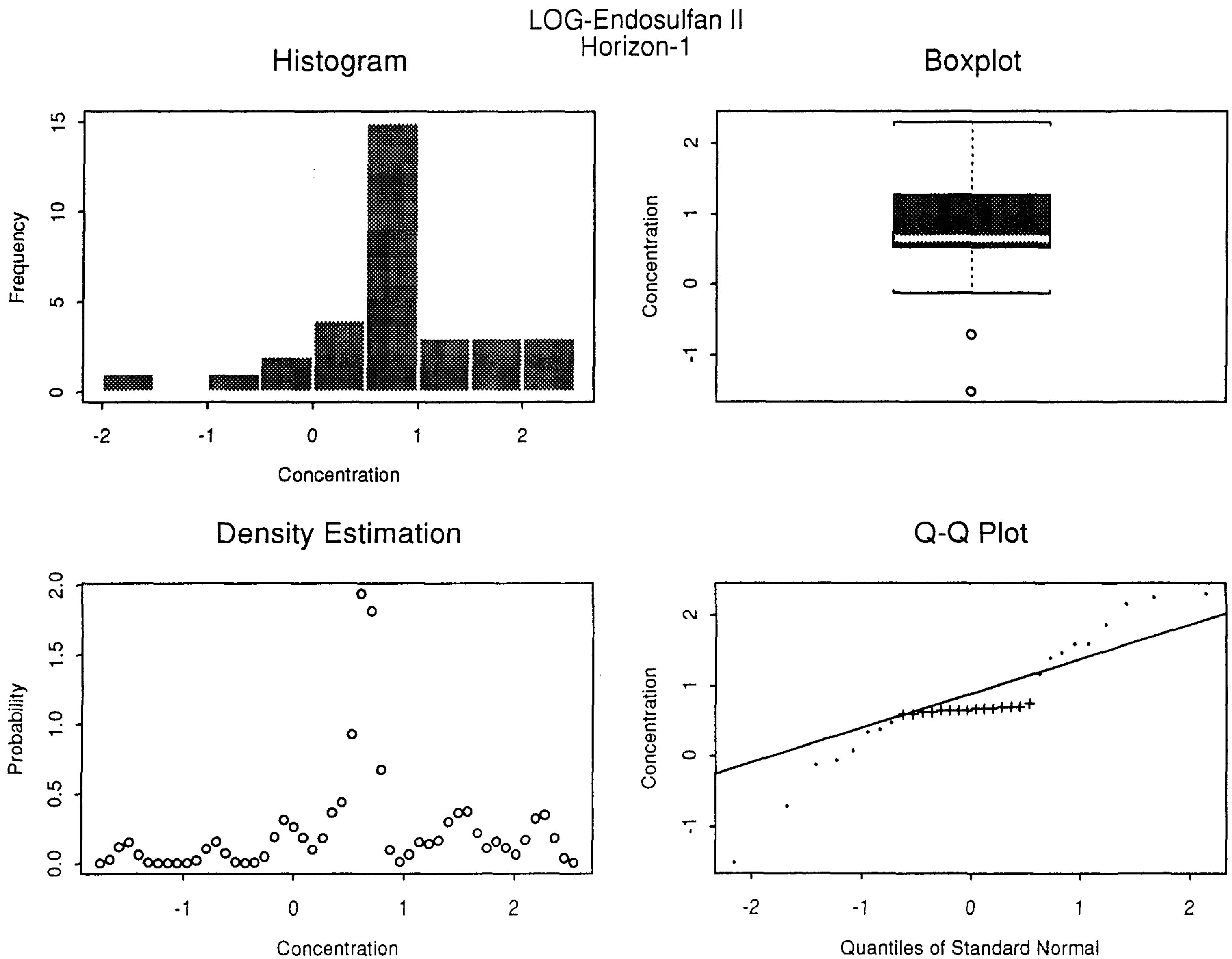
LOG-Indeno(1,2,3-cd)pyrene
Horizon-1



LOG-Fluorene
Horizon-1

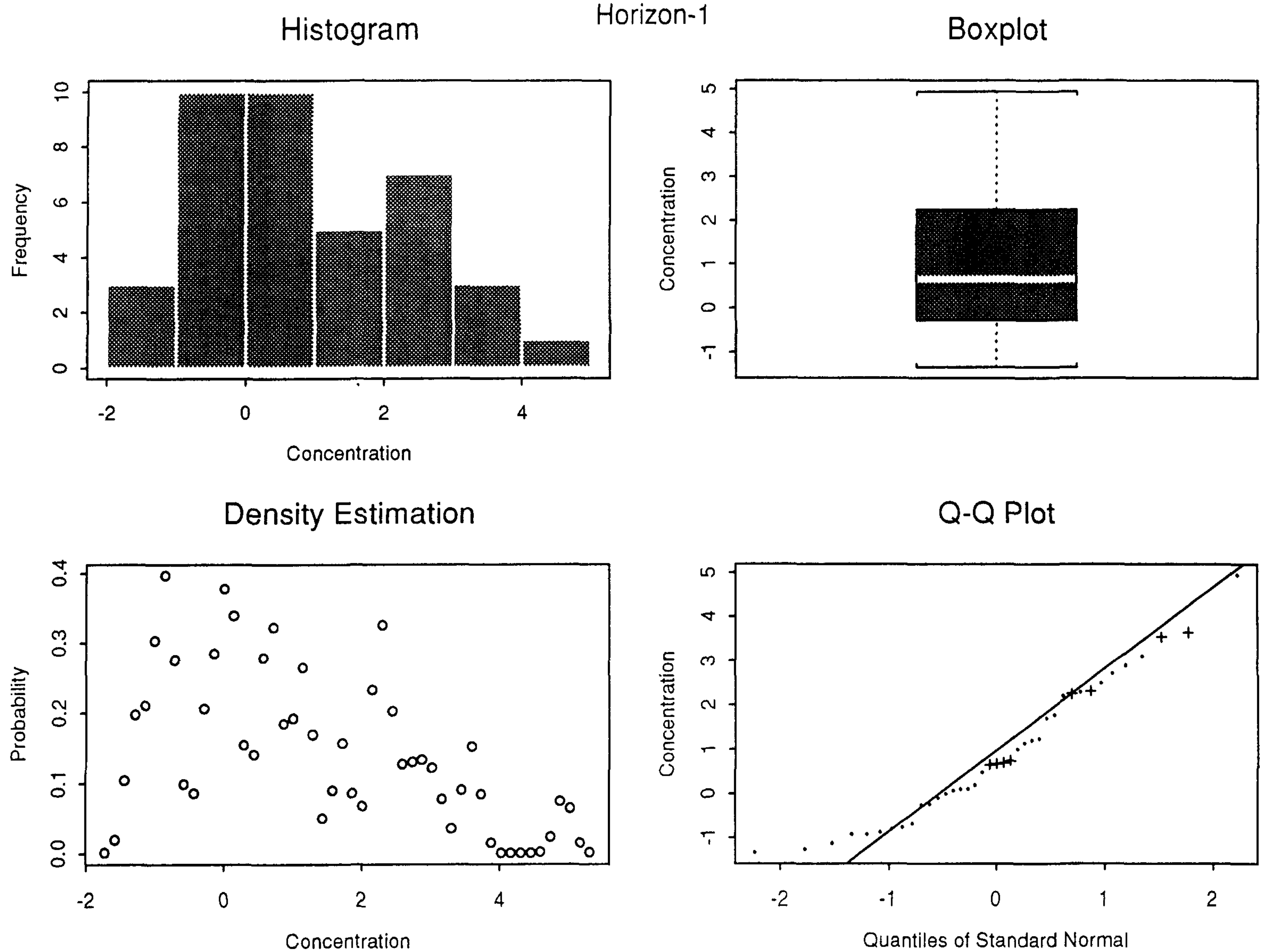



LOG-Fluoranthene
Horizon-1
Histogram
Frequency
0
5
10
15
20
2
4
6
8
10
12
14
Concentration
Boxplot
Concentration
4
6
8
10
12
Density Estimation
Probability
0.0
0.10
0.20
0.30
4
6
8
10
12
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
-2
-1
0
1
2
Quantiles of Standard Normal

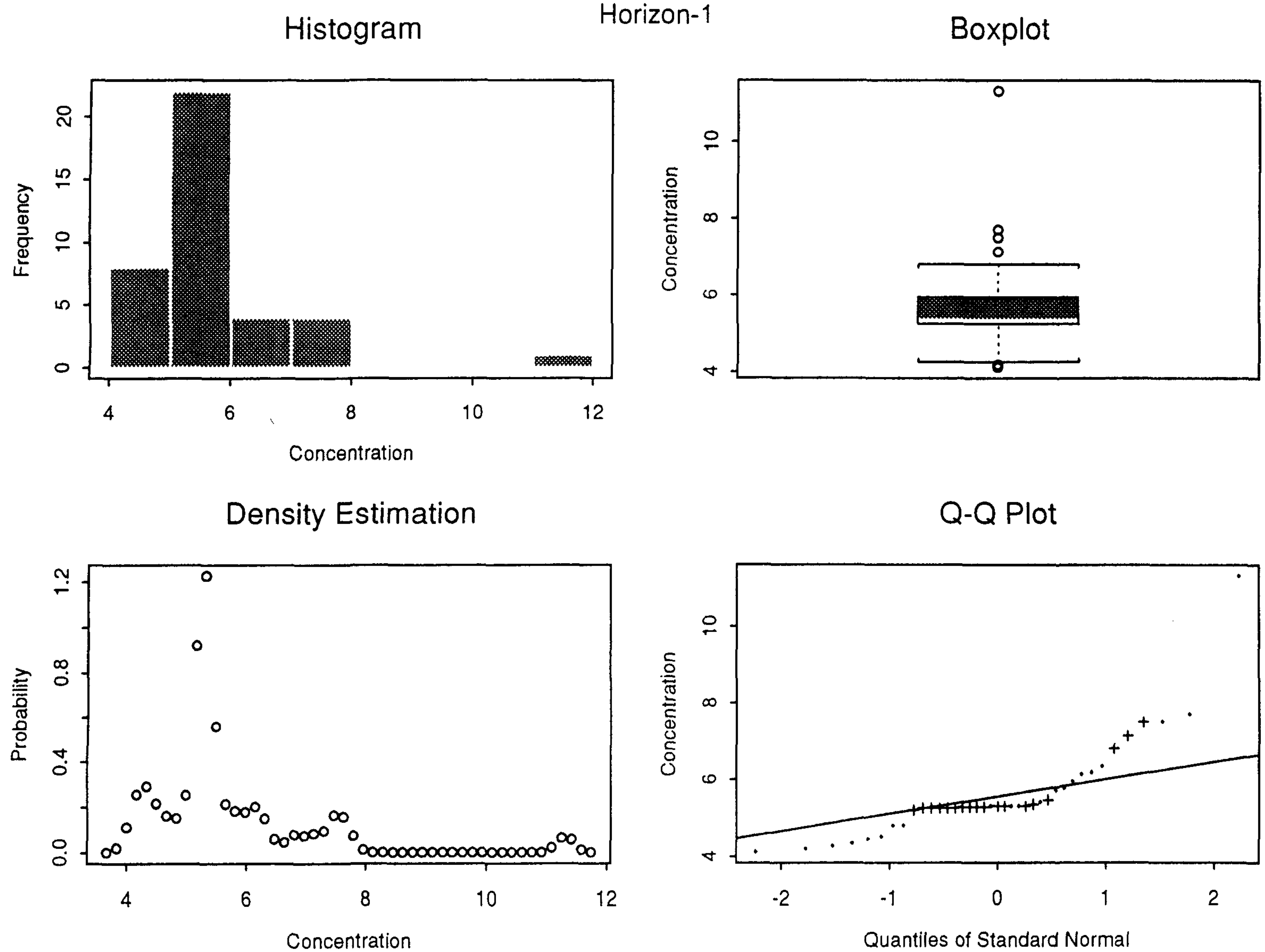


LOG-Endosulfan II
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

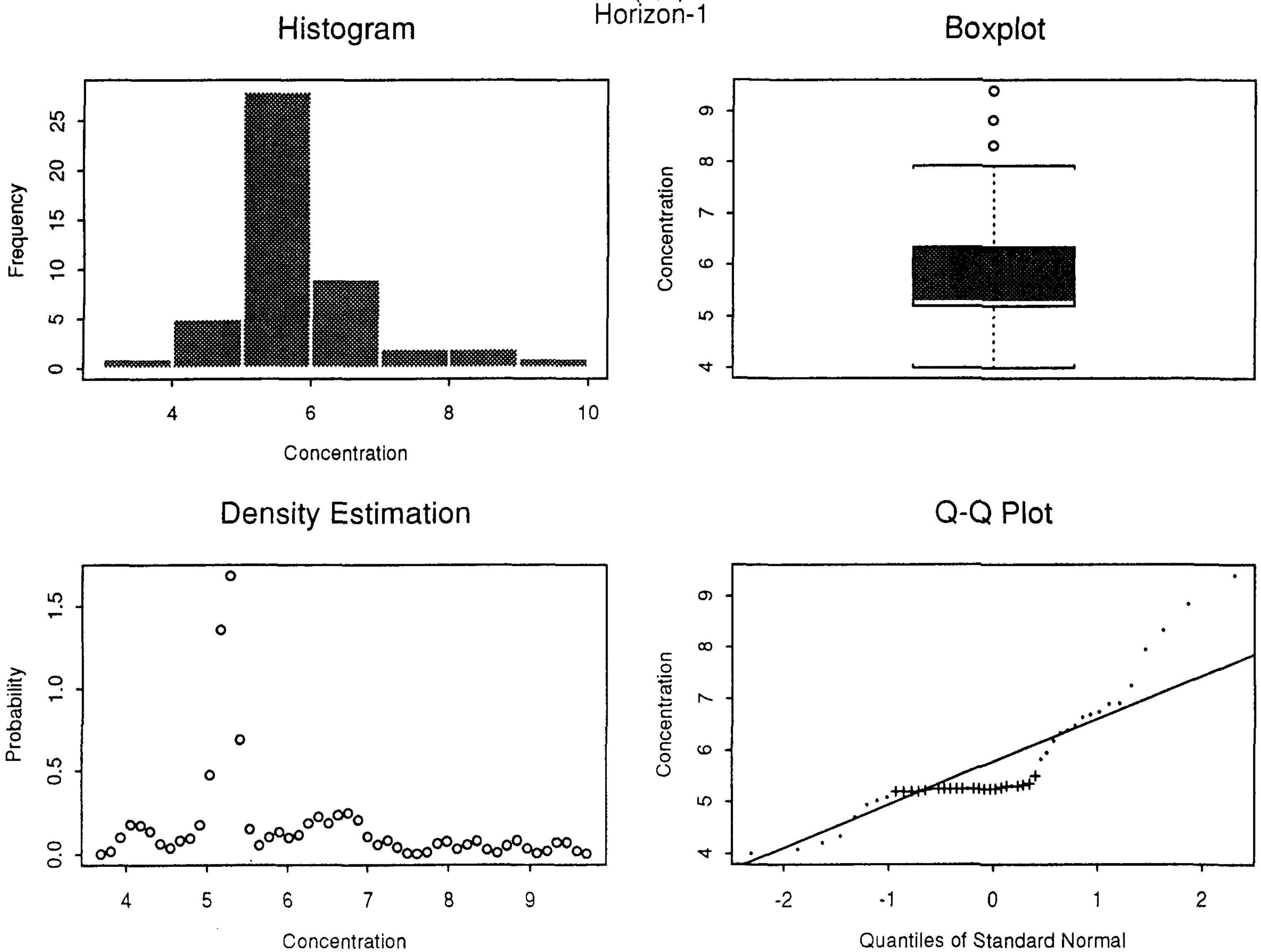
LOG-Dieldrin
Horizon-1

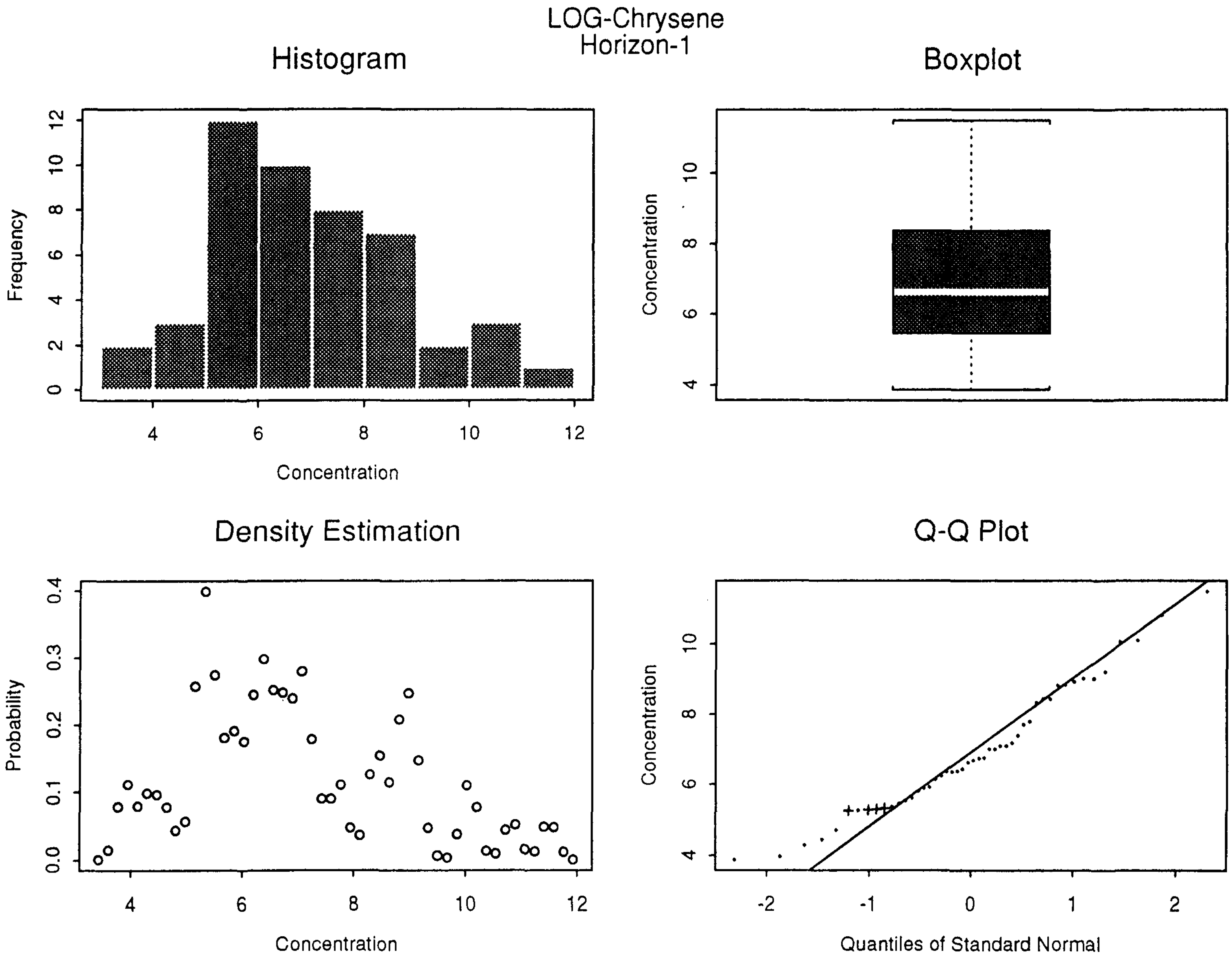


LOG-Dibenzofuran
Horizon-1

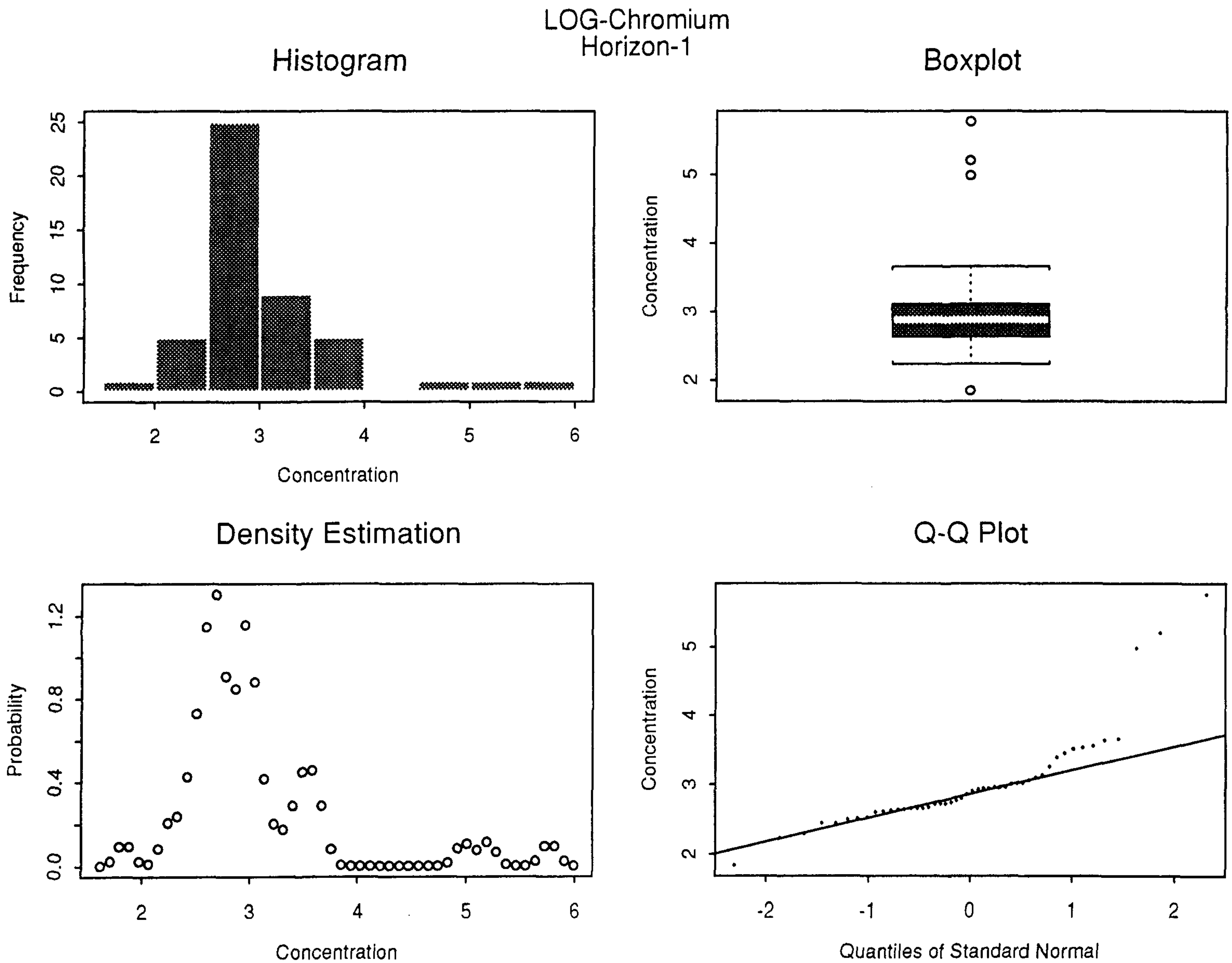


LOG-Dibenz(a,h)anthracene
Horizon-1

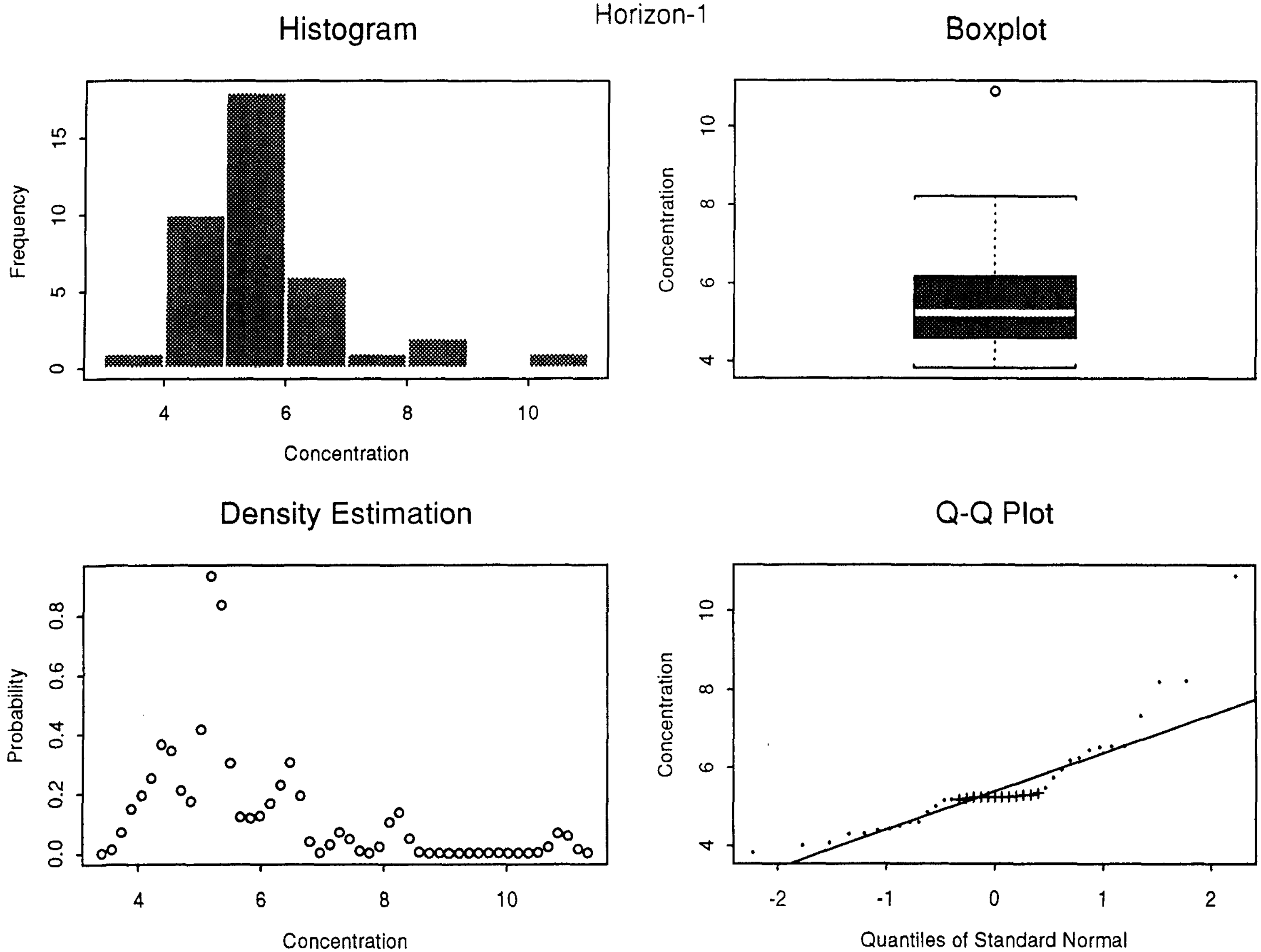


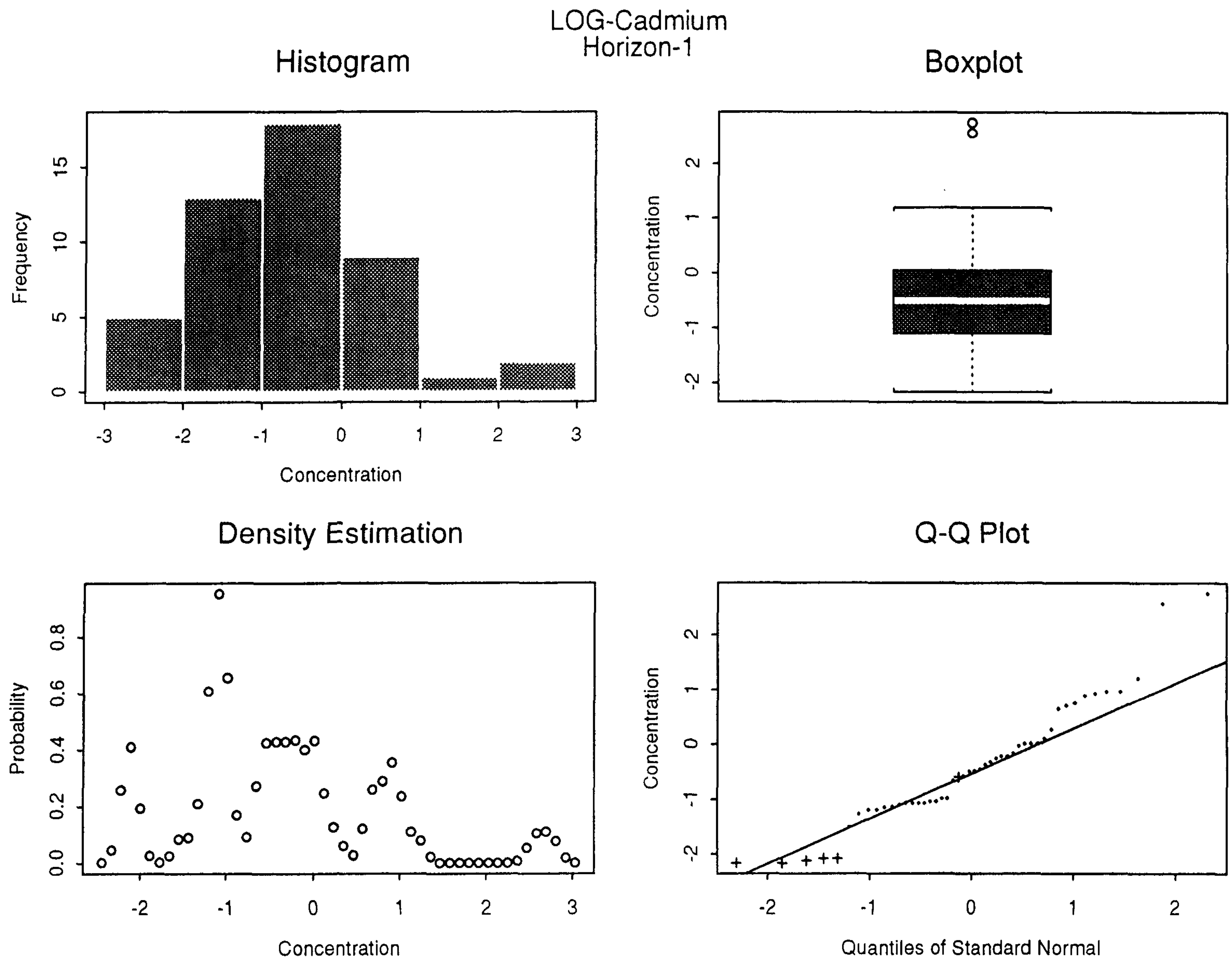


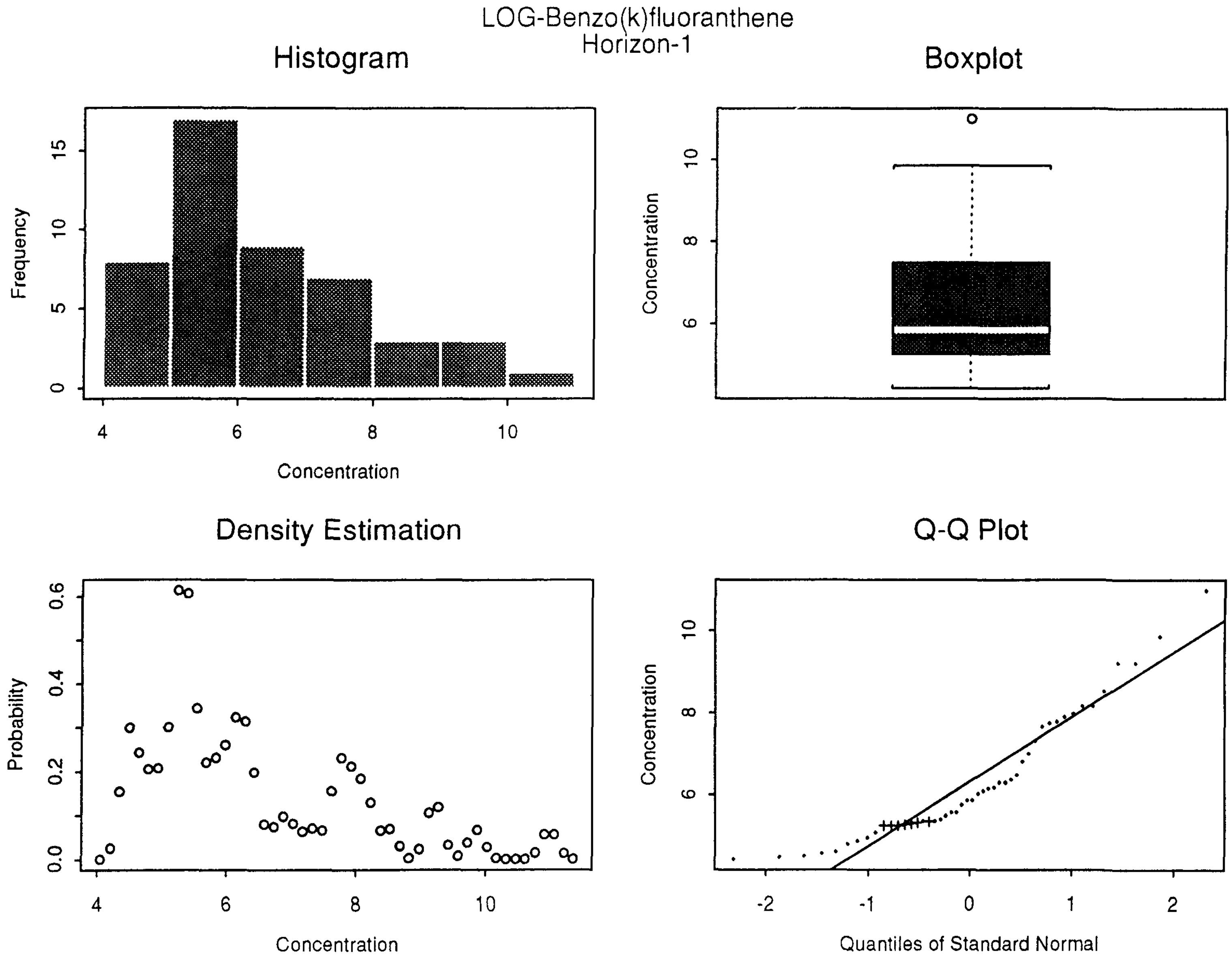
LOG-Chrysene
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

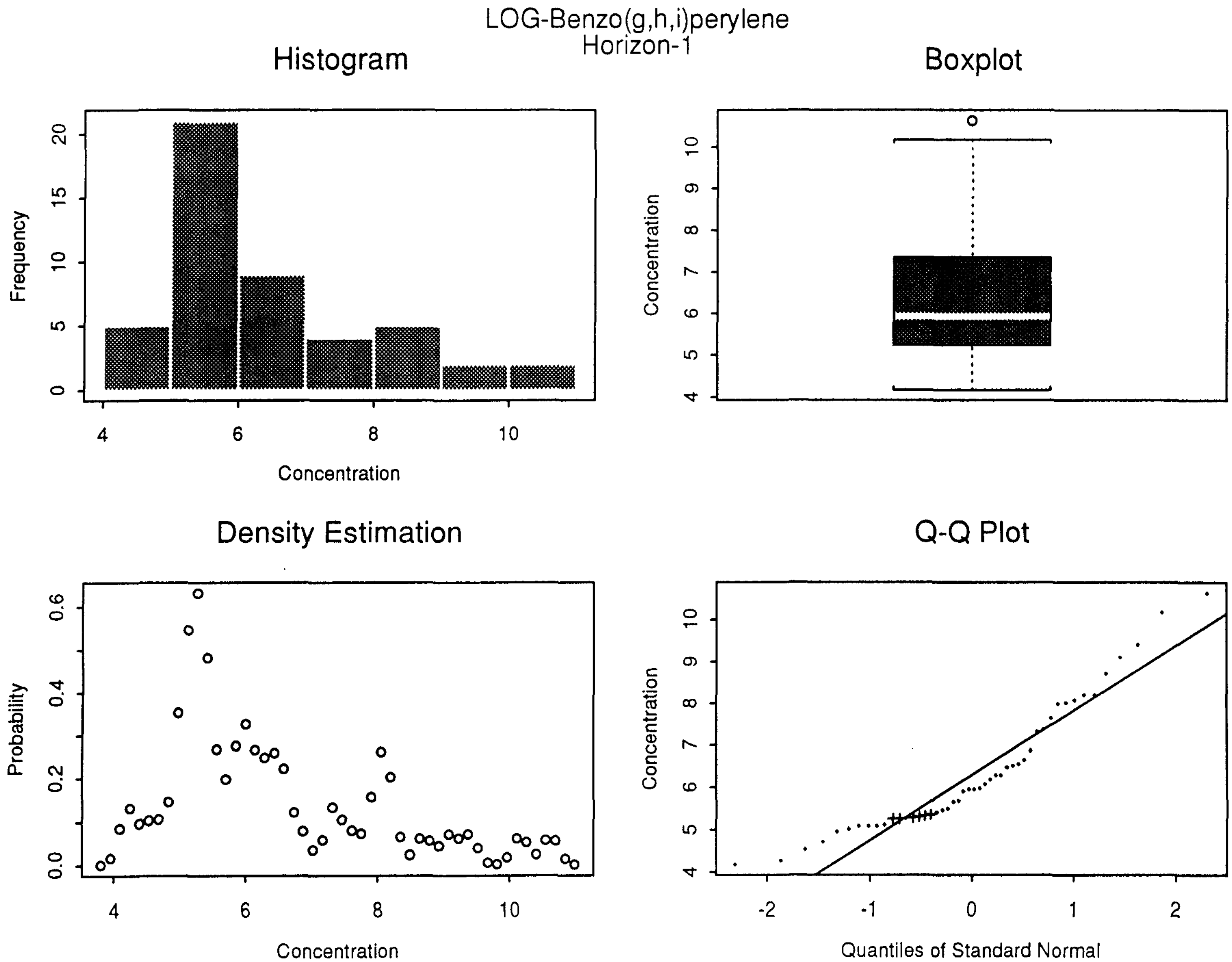

LOG-Chromium
Horizon-1
Histogram
Frequency
0
5
10
15
20
25
2
3
4
5
6
Concentration
Boxplot
Concentration
2
3
4
5
Density Estimation
Probability
0.0
0.4
0.8
1.2
2
3
4
5
6
Concentration
Q-Q Plot
Concentration
2
3
4
5
-2
-1
0
1
2
Quantiles of Standard Normal

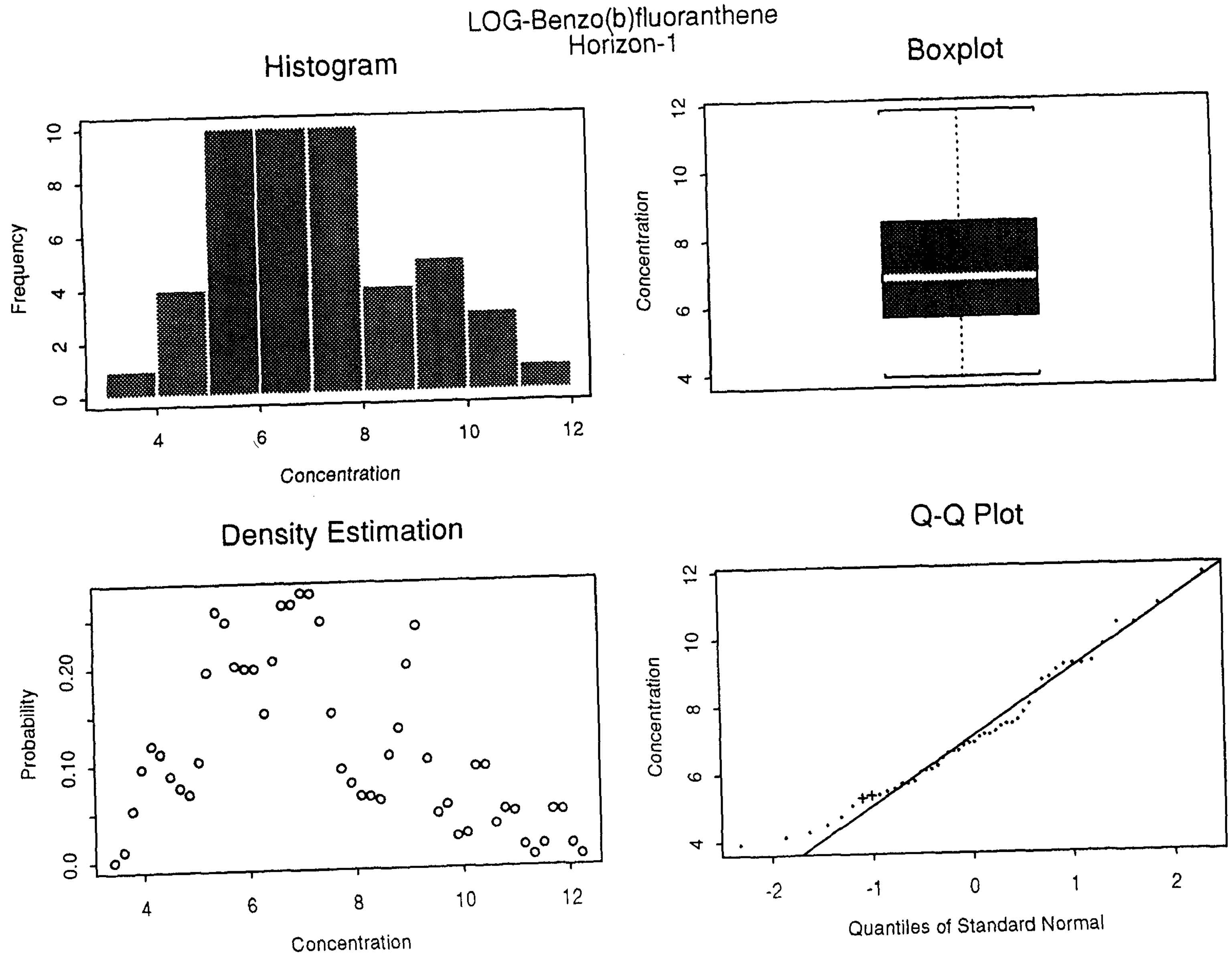
LOG-Carbazole
Horizon-1



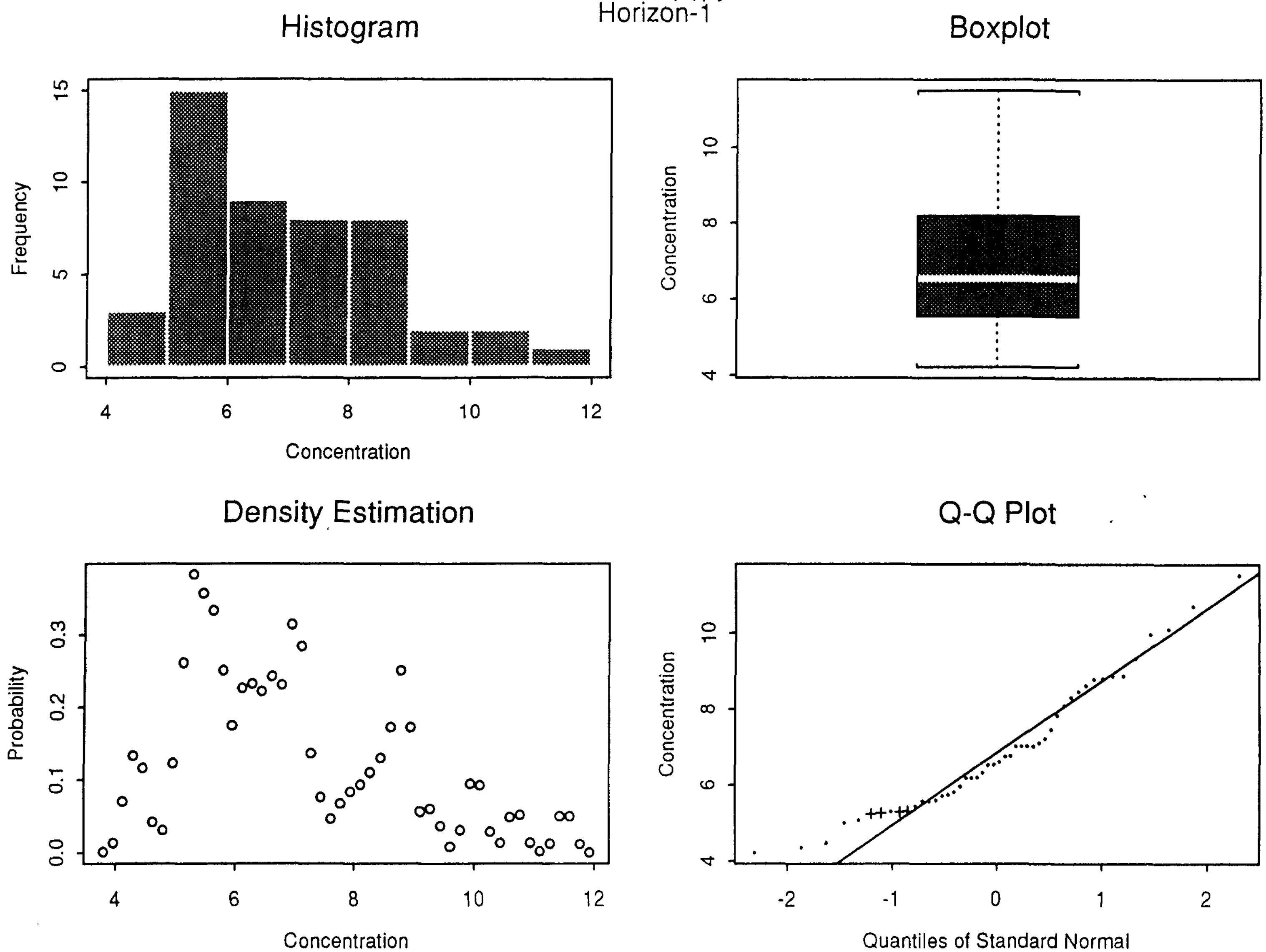

LOG-Cadmium
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal


LOG-Benzo(k)fluoranthene
Horizon-1
Histogram
Frequency
0
5
10
15
4
6
8
10
Concentration
Boxplot
Concentration
6
8
10
Density Estimation
Probability
0.0
0.2
0.4
0.6
4
6
8
10
Concentration
Q-Q Plot
Concentration
6
8
10
-2
-1
0
1
2
Quantiles of Standard Normal

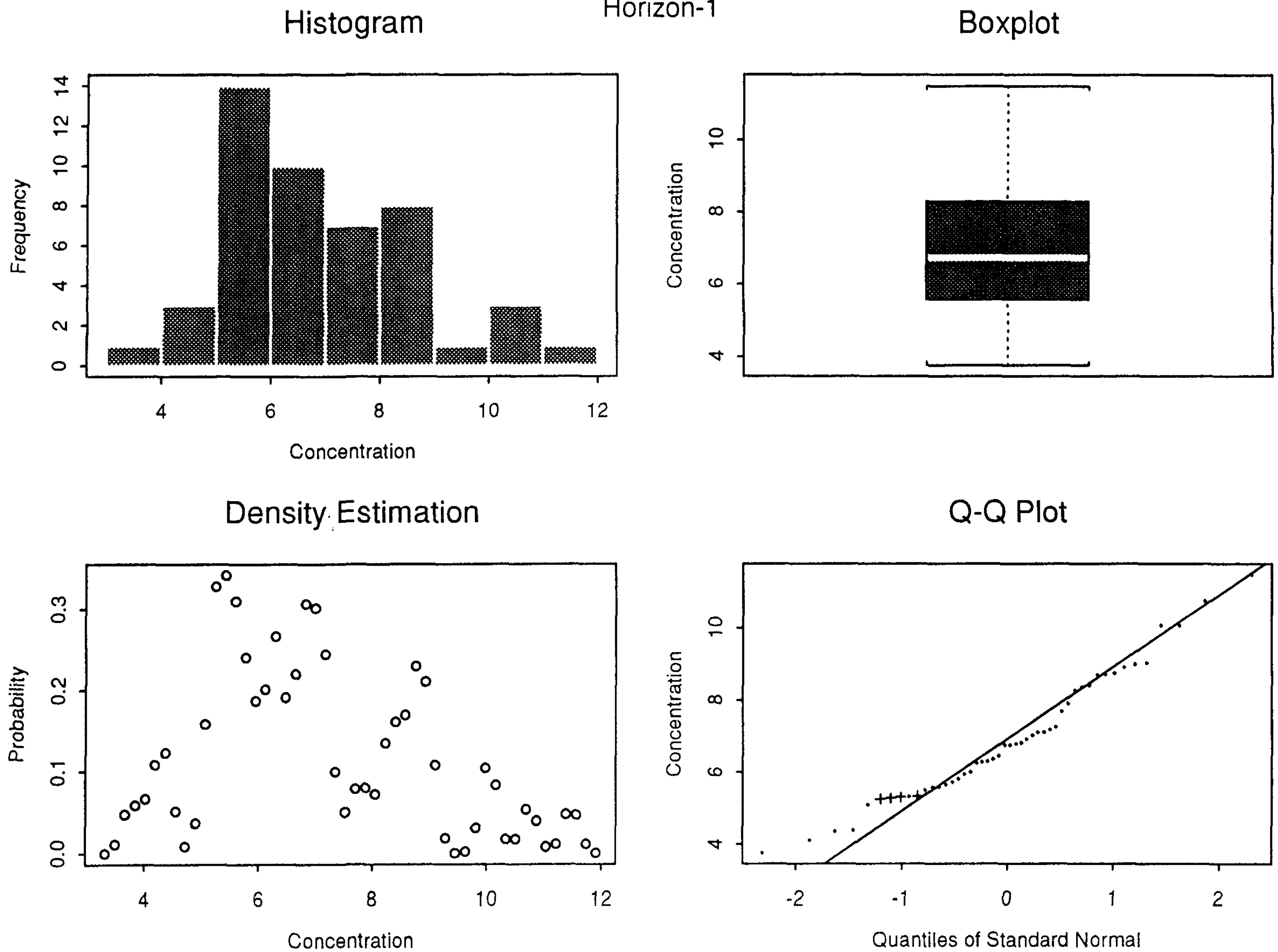

LOG-Benzo(g,h,i)perylene
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

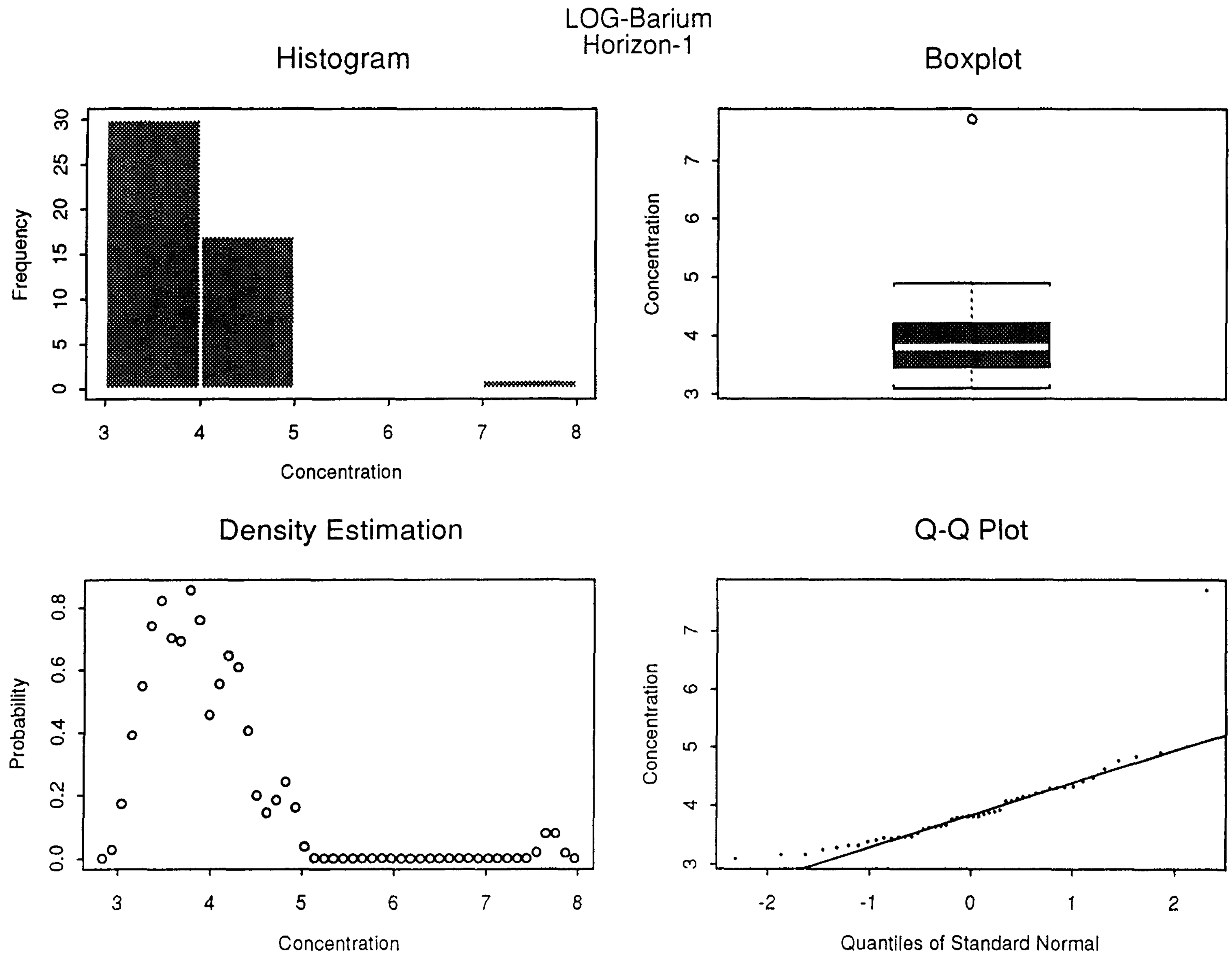

LOG-Benzo(b)fluoranthene
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

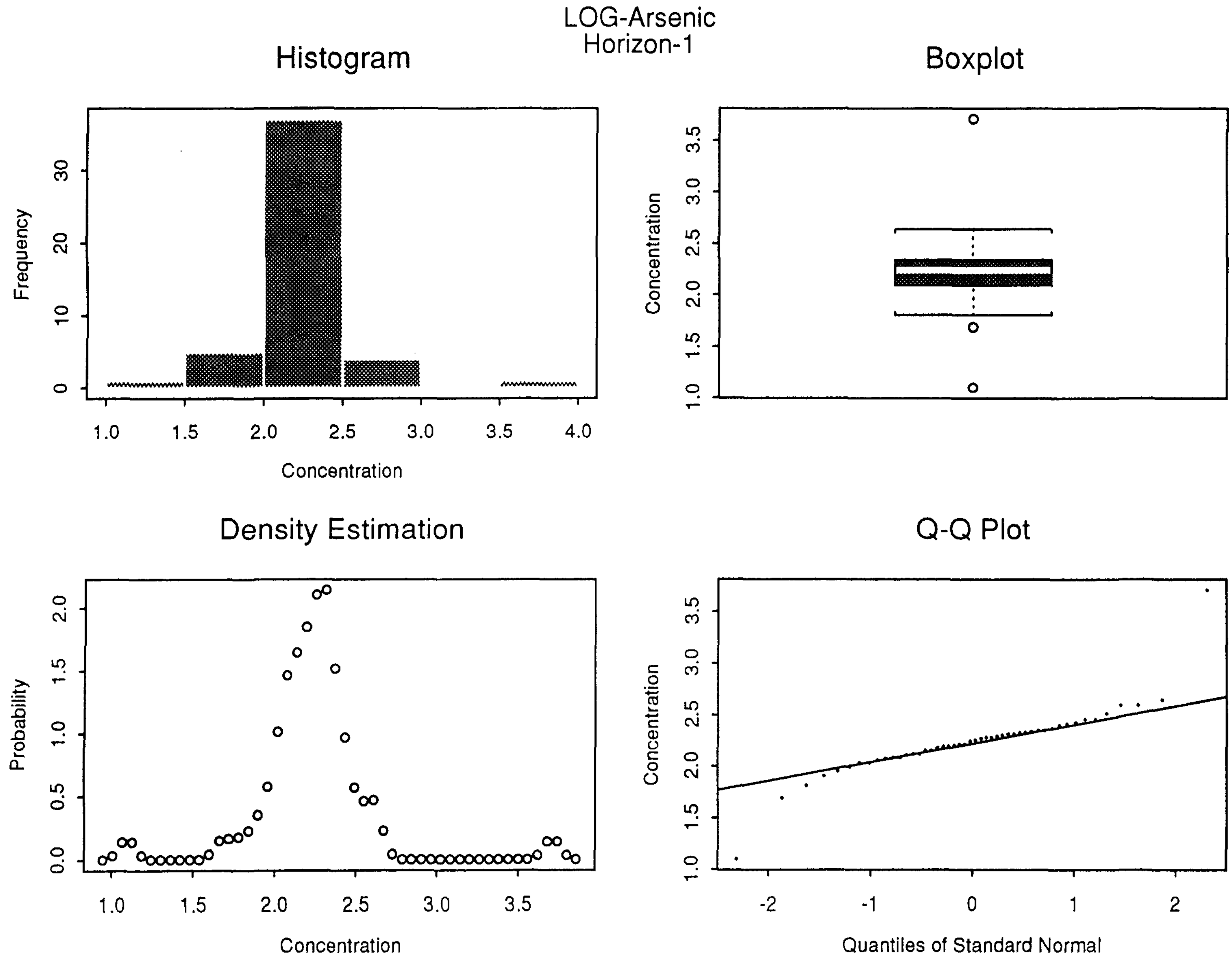
LOG-Benzo(a)pyrene
Horizon-1



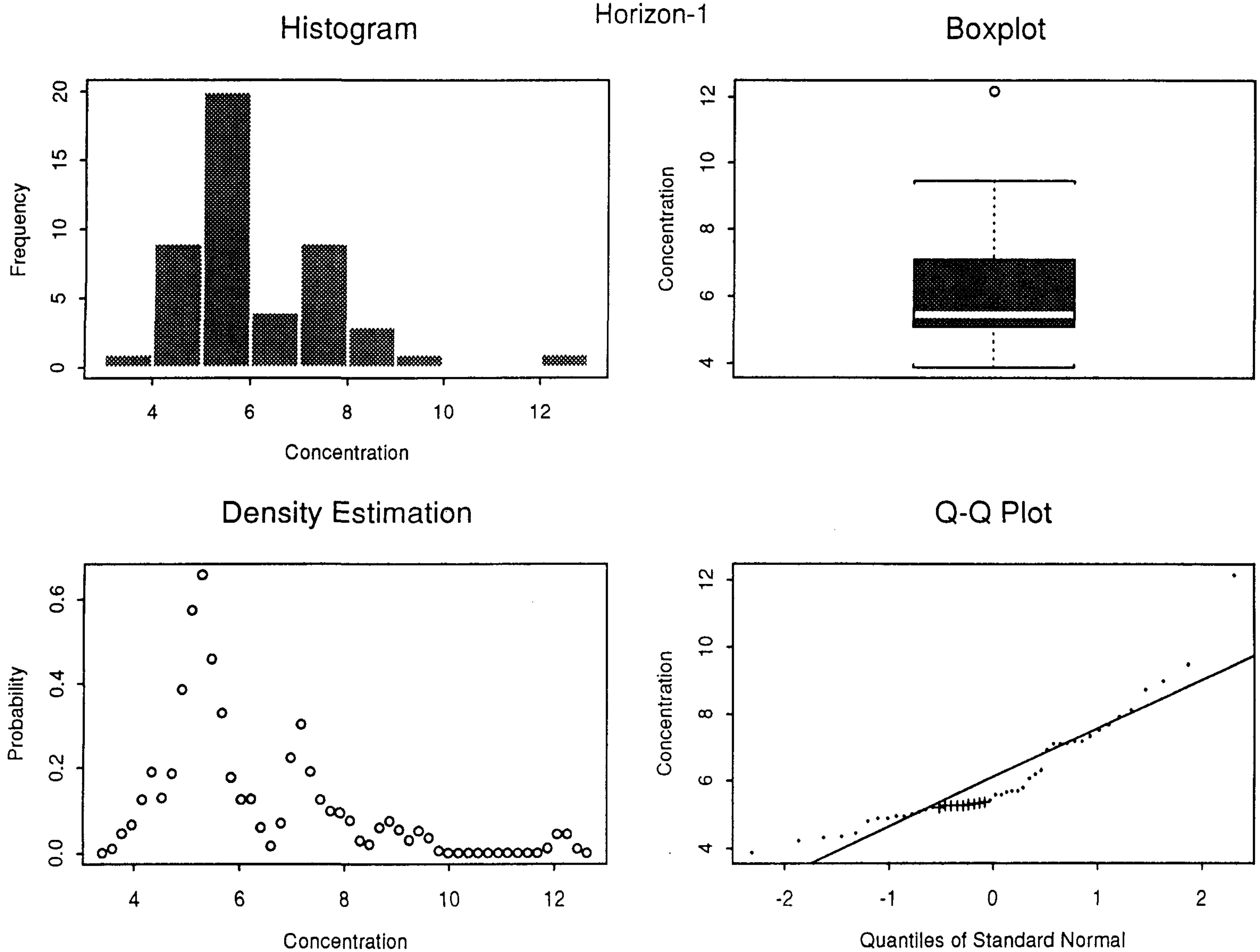
LOG-Benzo(a)Anthracene
Horizon-1



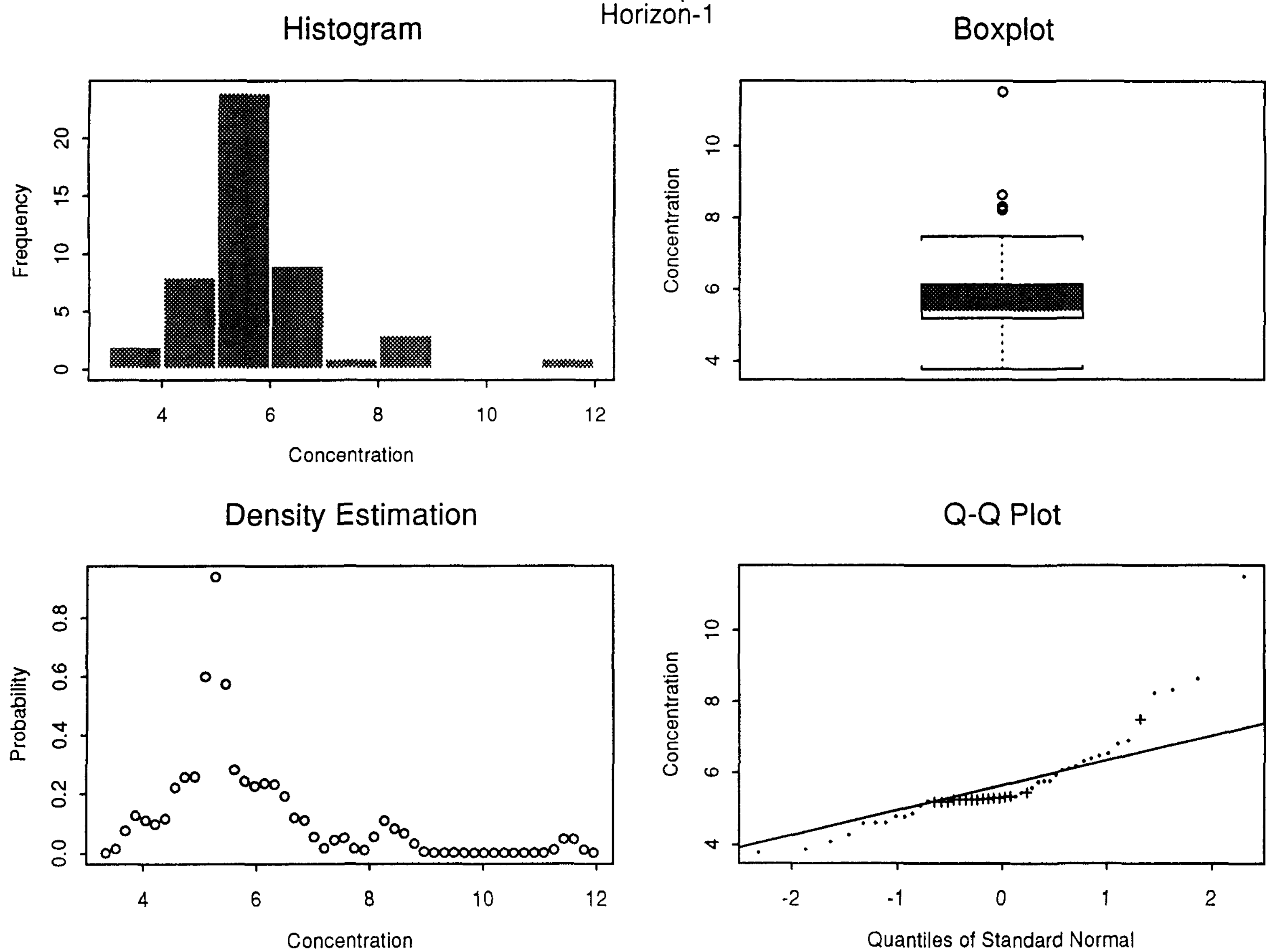

LOG-Barium
Horizon-1
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal


LOG-Arsenic
Horizon-1
Histogram
Frequency
0
10
20
30
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Concentration
Boxplot
Concentration
1.0
1.5
2.0
2.5
3.0
3.5
Density Estimation
Probability
0.0
0.5
1.0
1.5
2.0
1.0
1.5
2.0
2.5
3.0
3.5
Concentration
Q-Q Plot
Concentration
1.0
1.5
2.0
2.5
3.0
3.5
-2
-1
0
1
2
Quantiles of Standard Normal

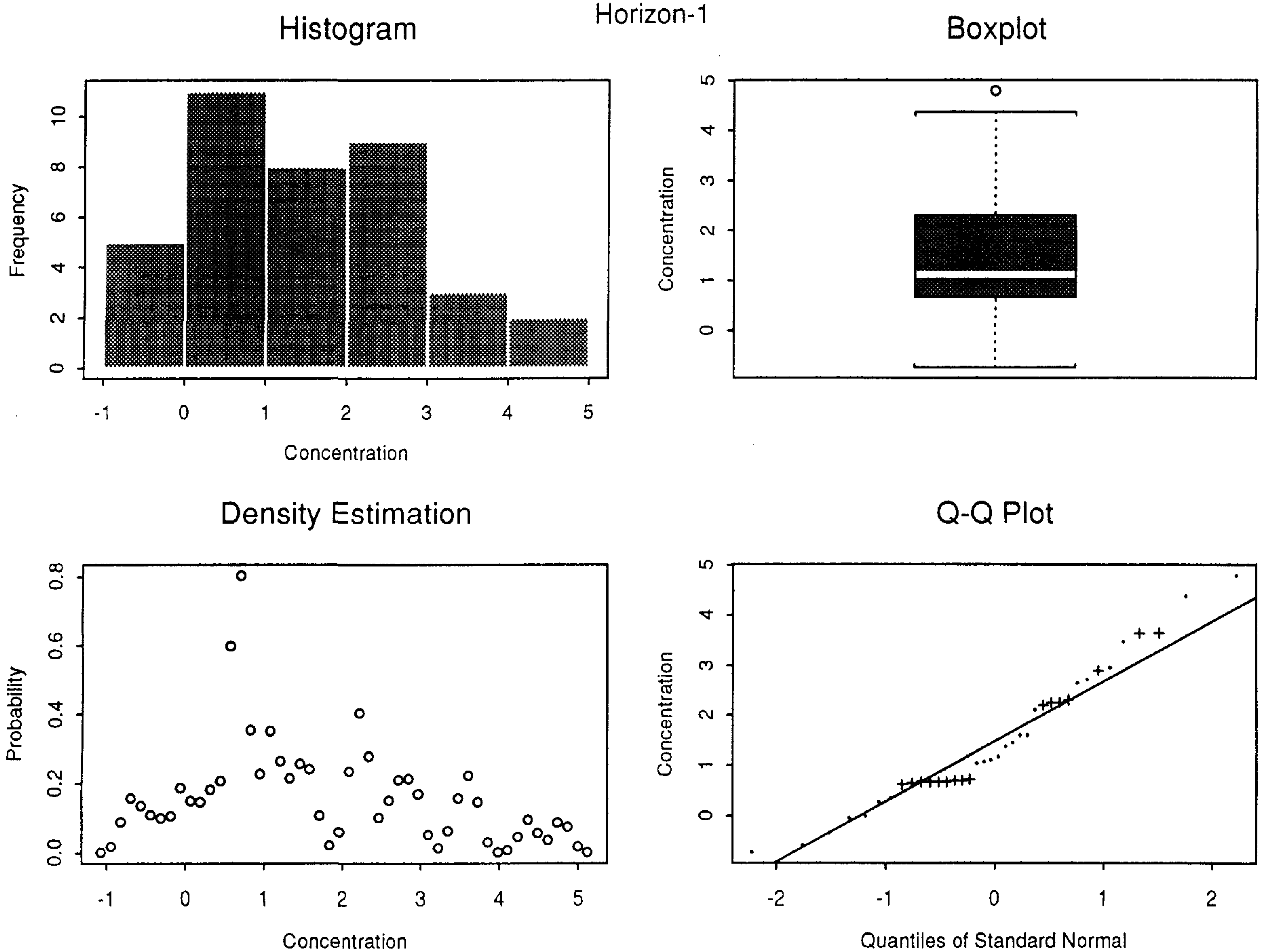
LOG-Anthracene
Horizon-1



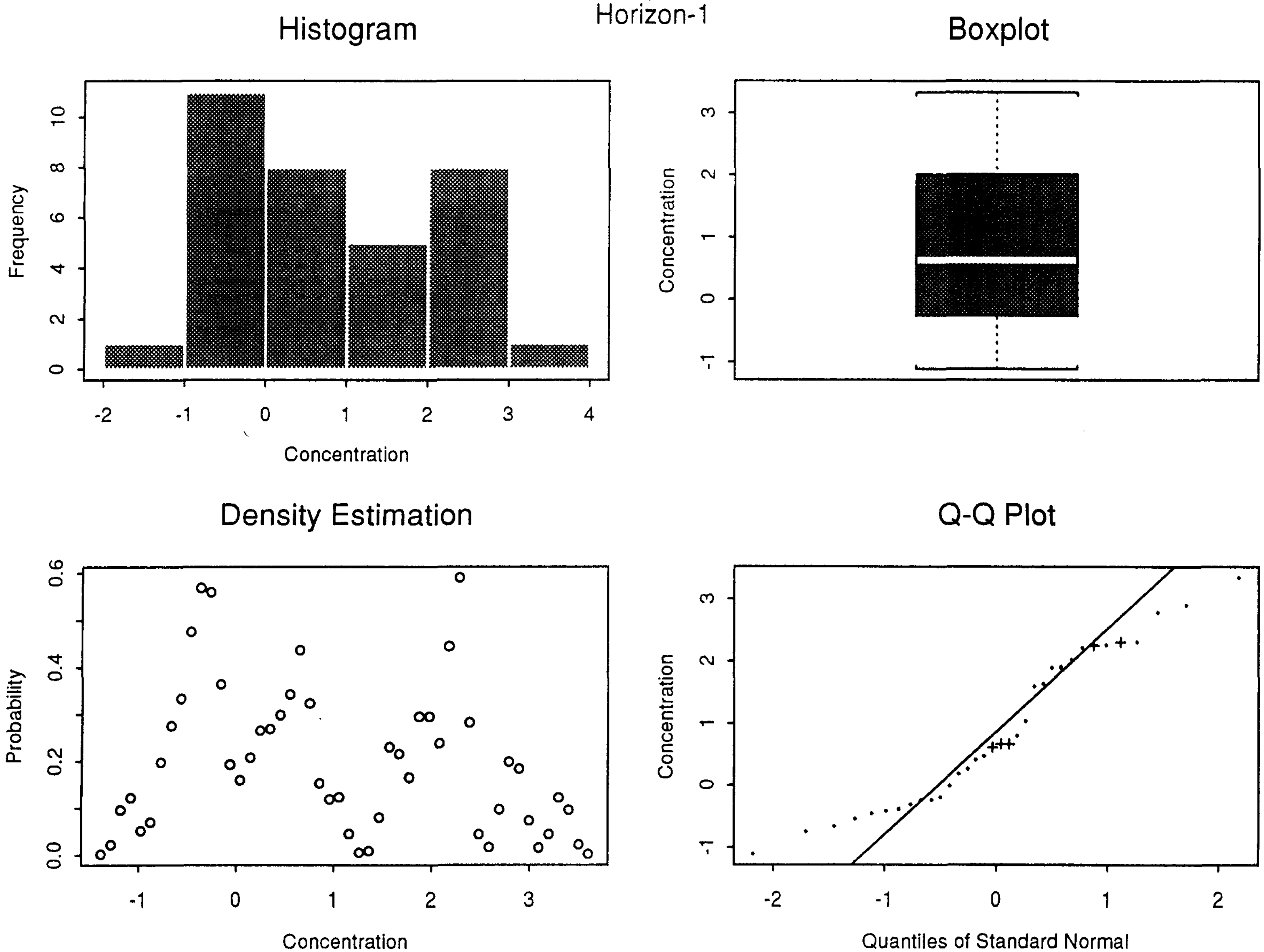
LOG-Acenaphthene
Horizon-1



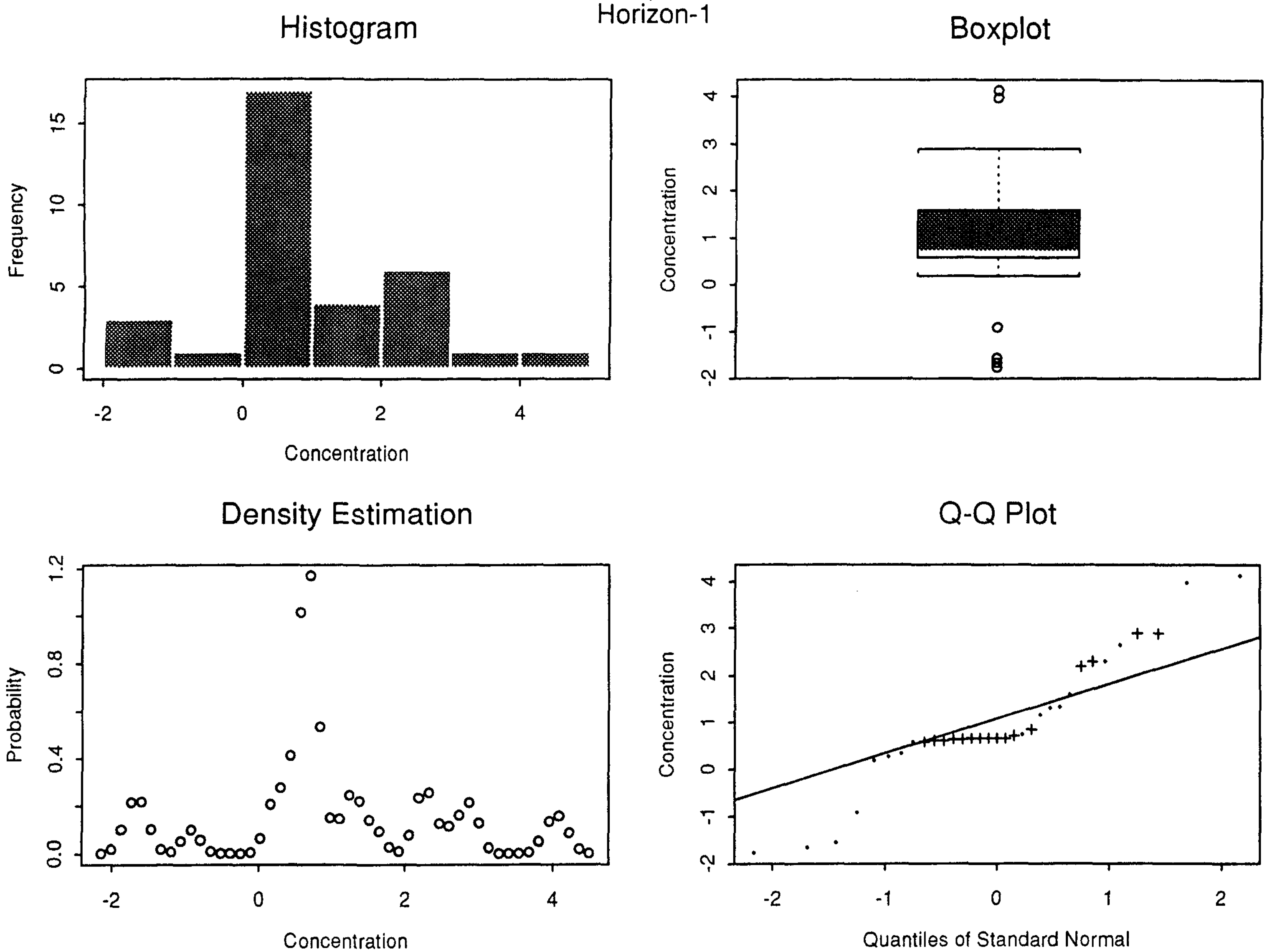
LOG-4,4'-DDT
Horizon-1



LOG-4,4'-DDE
Horizon-1

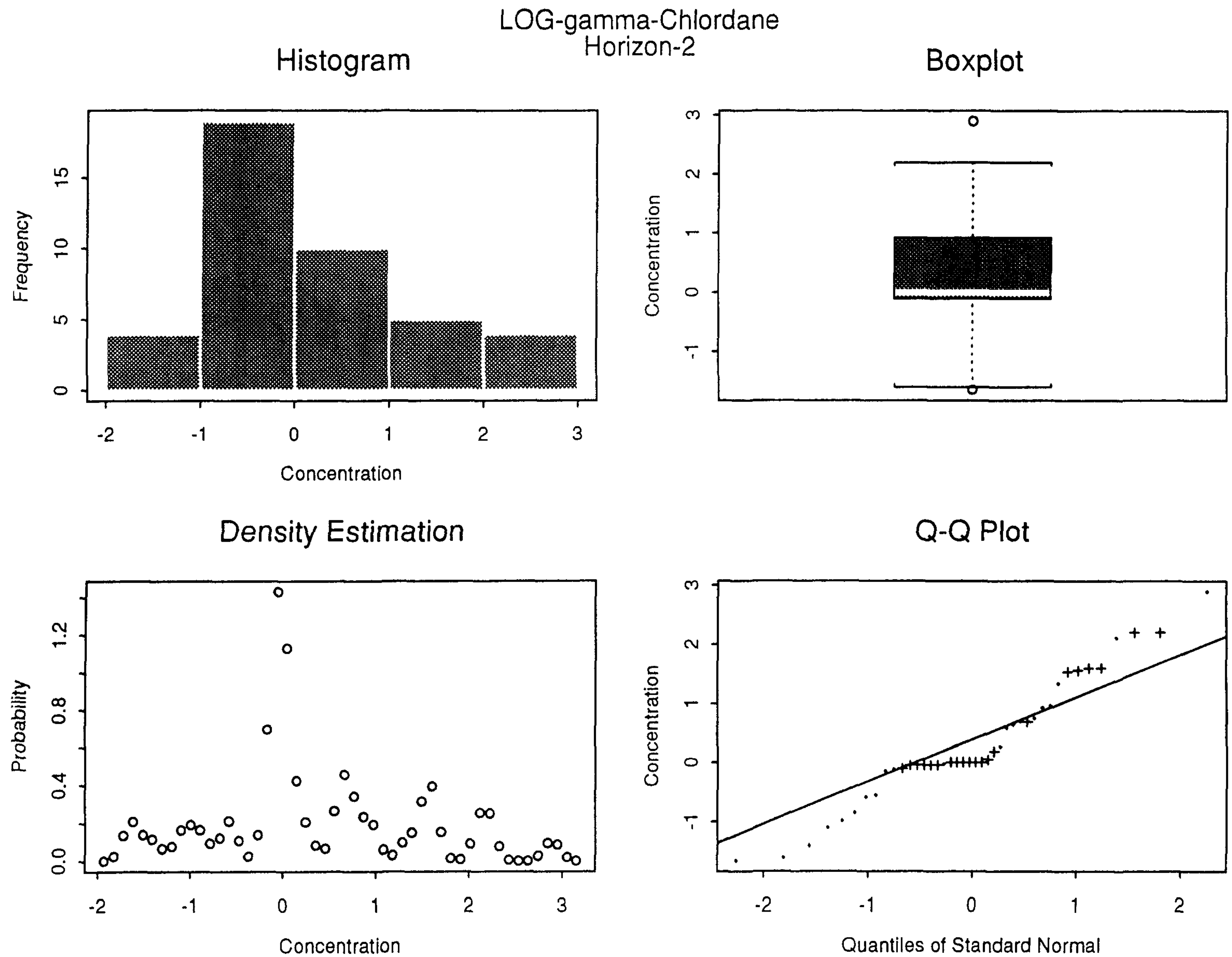


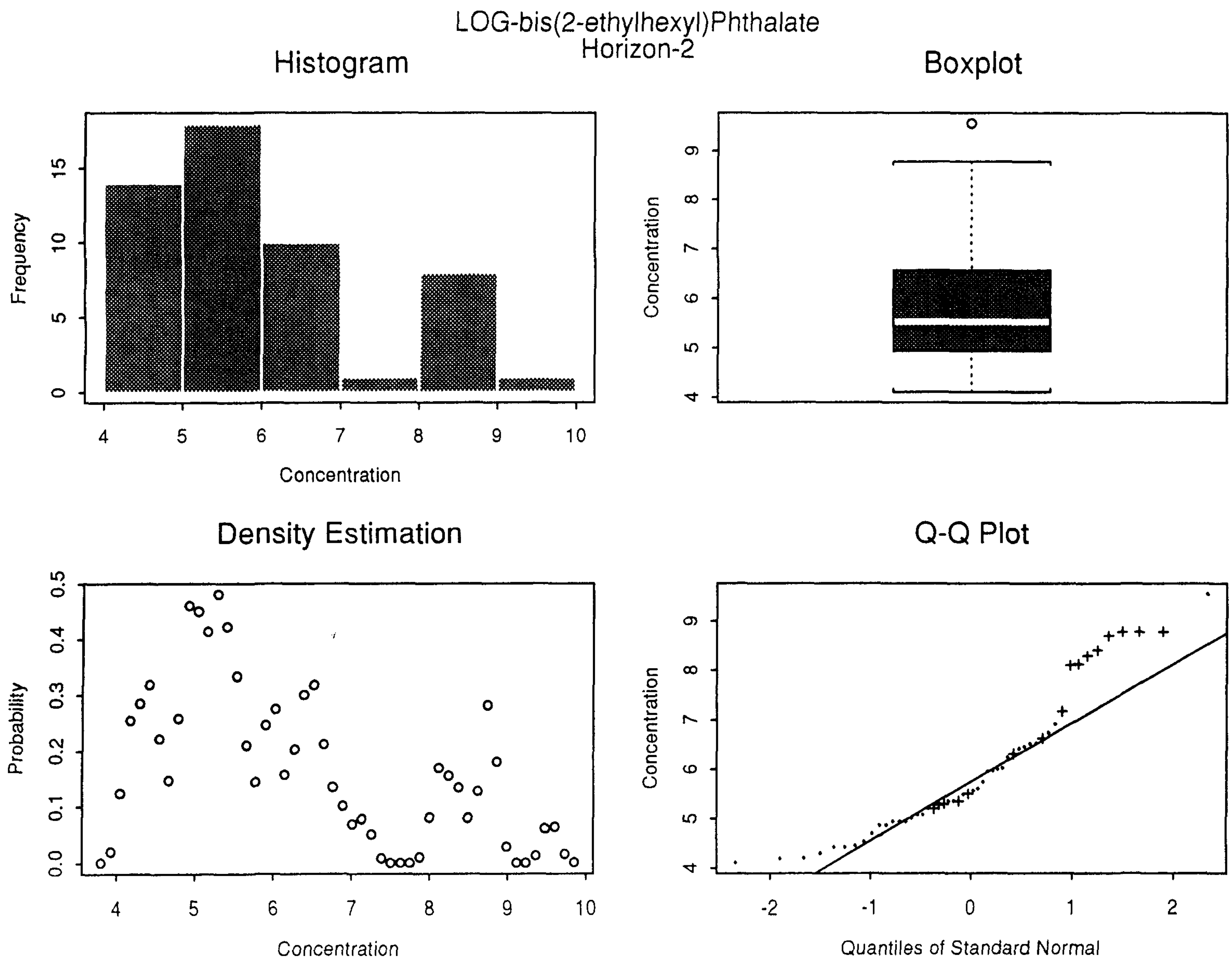
LOG-4,4'-DDD
Horizon-1

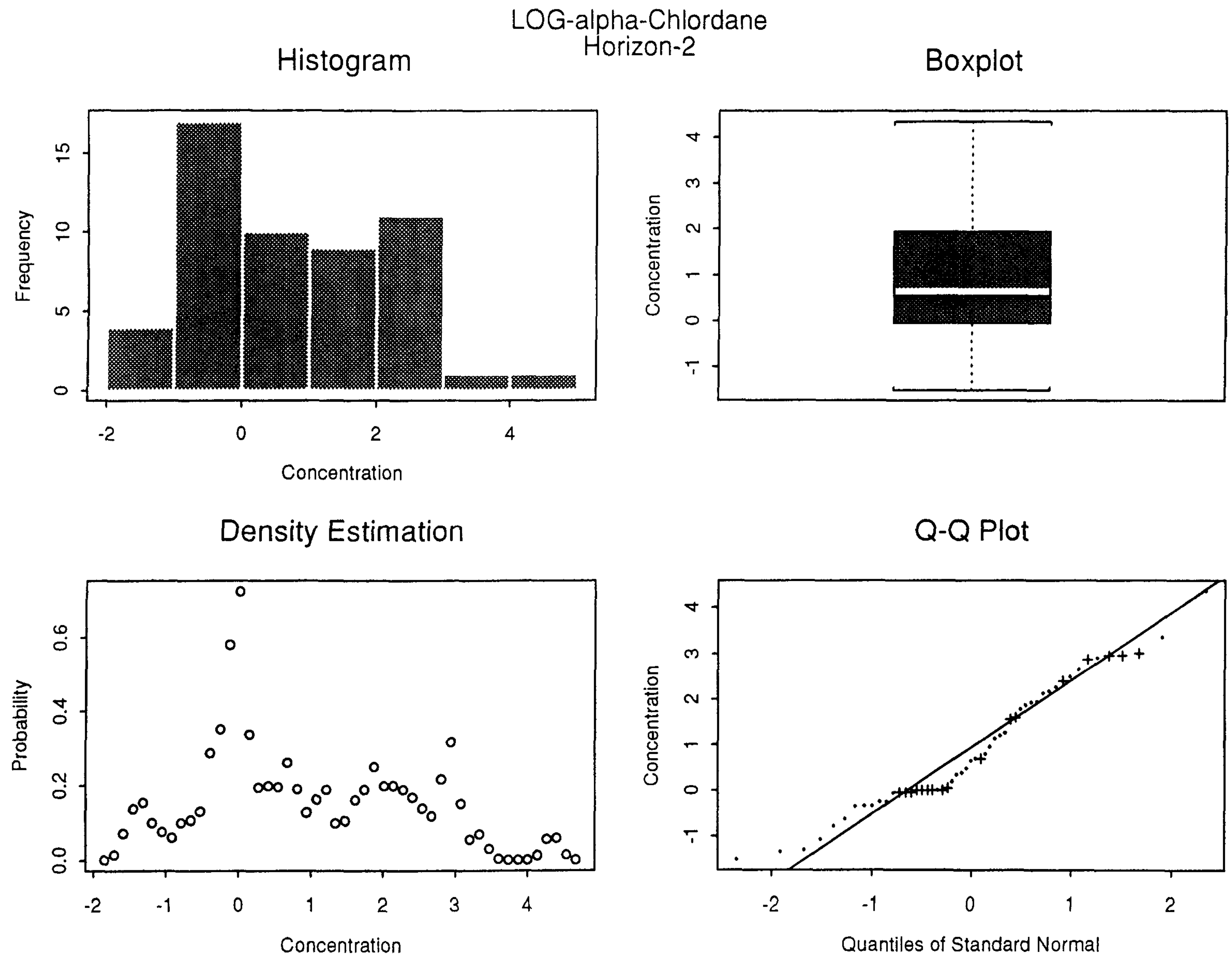


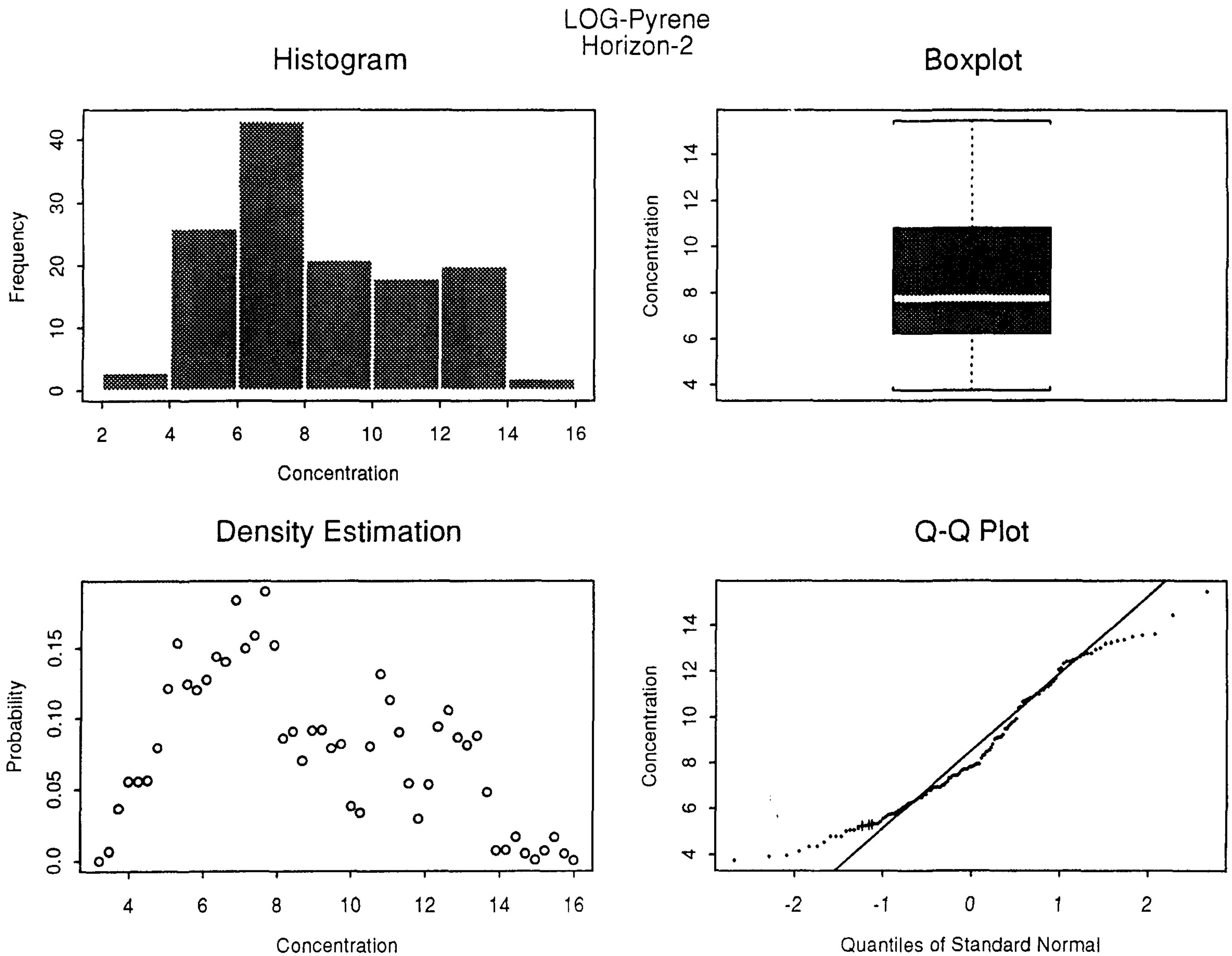
APPENDIX A.3

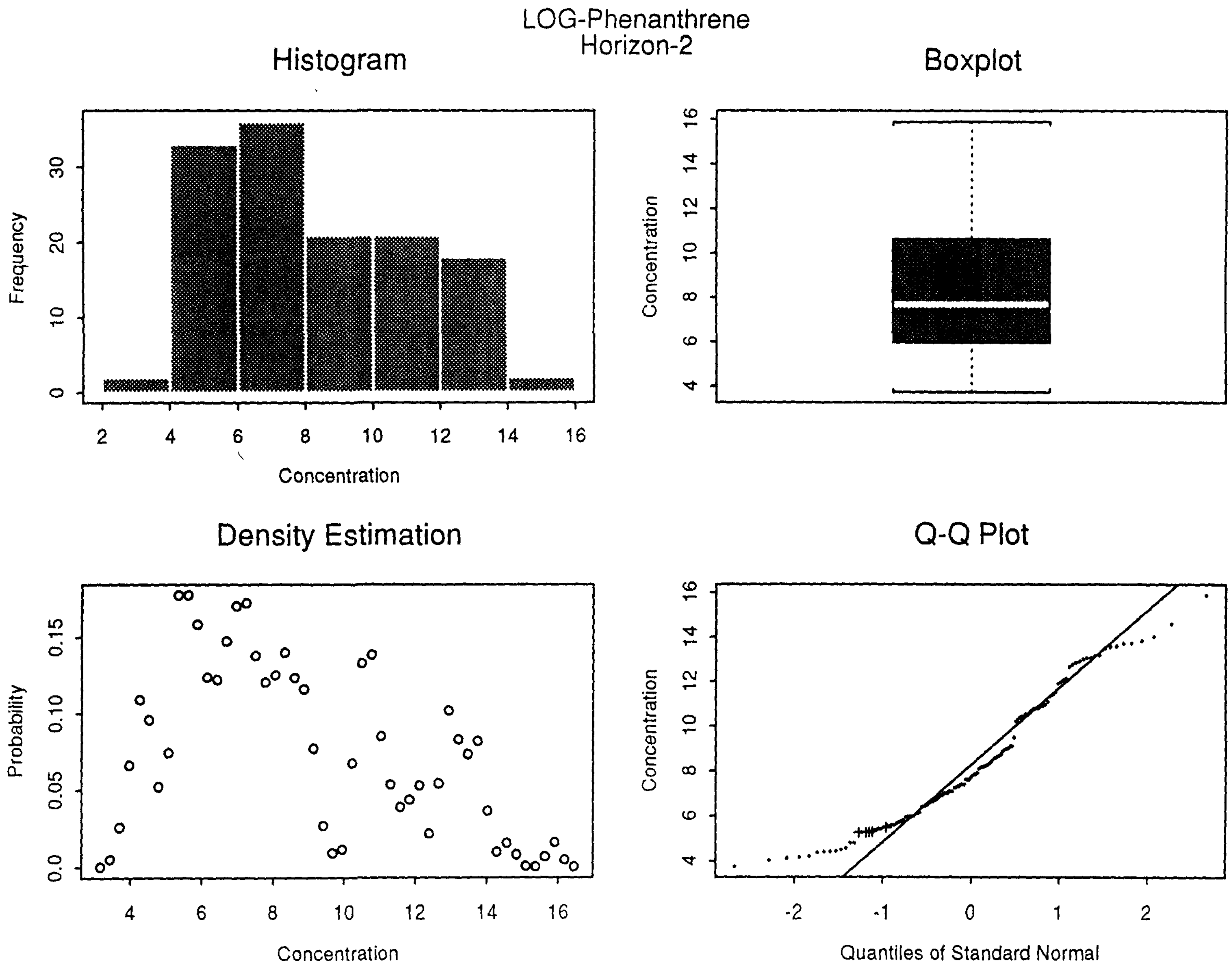
PLOTS FOR HORIZON 2
(0 - 10 FEET)


LOG-gamma-Chlordane
Horizon-2
Histogram
Frequency
0
5
10
15
-2
-1
0
1
2
3
Concentration
Boxplot
Concentration
-1
0
1
2
3
Density Estimation
Probability
0.0
0.4
0.8
1.2
-2
-1
0
1
2
3
Concentration
Q-Q Plot
Concentration
-1
0
1
2
3
-2
-1
0
1
2
Quantiles of Standard Normal


LOG-bis(2-ethylhexyl)Phthalate
Horizon-2
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

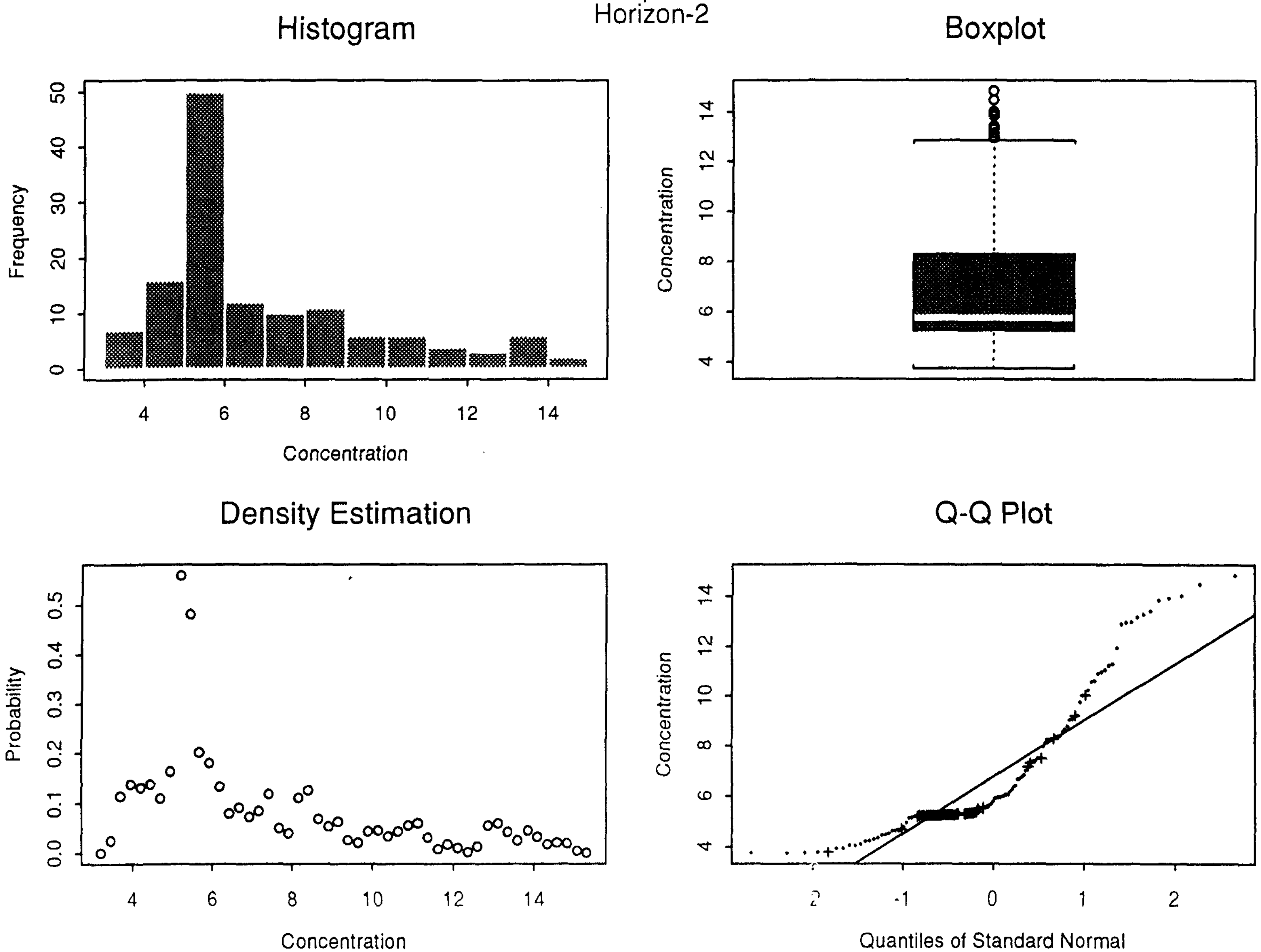

LOG-alpha-Chlordane
Horizon-2
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal


LOG-Pyrene
Horizon-2
Histogram
Frequency
0 10 20 30 40
2 4 6 8 10 12 14 16
Concentration
Boxplot
Concentration
4 6 8 10 12 14
Density Estimation
Probability
0.0 0.05 0.10 0.15
4 6 8 10 12 14 16
Concentration
Q-Q Plot
Concentration
4 6 8 10 12 14
-2 -1 0 1 2
Quantiles of Standard Normal

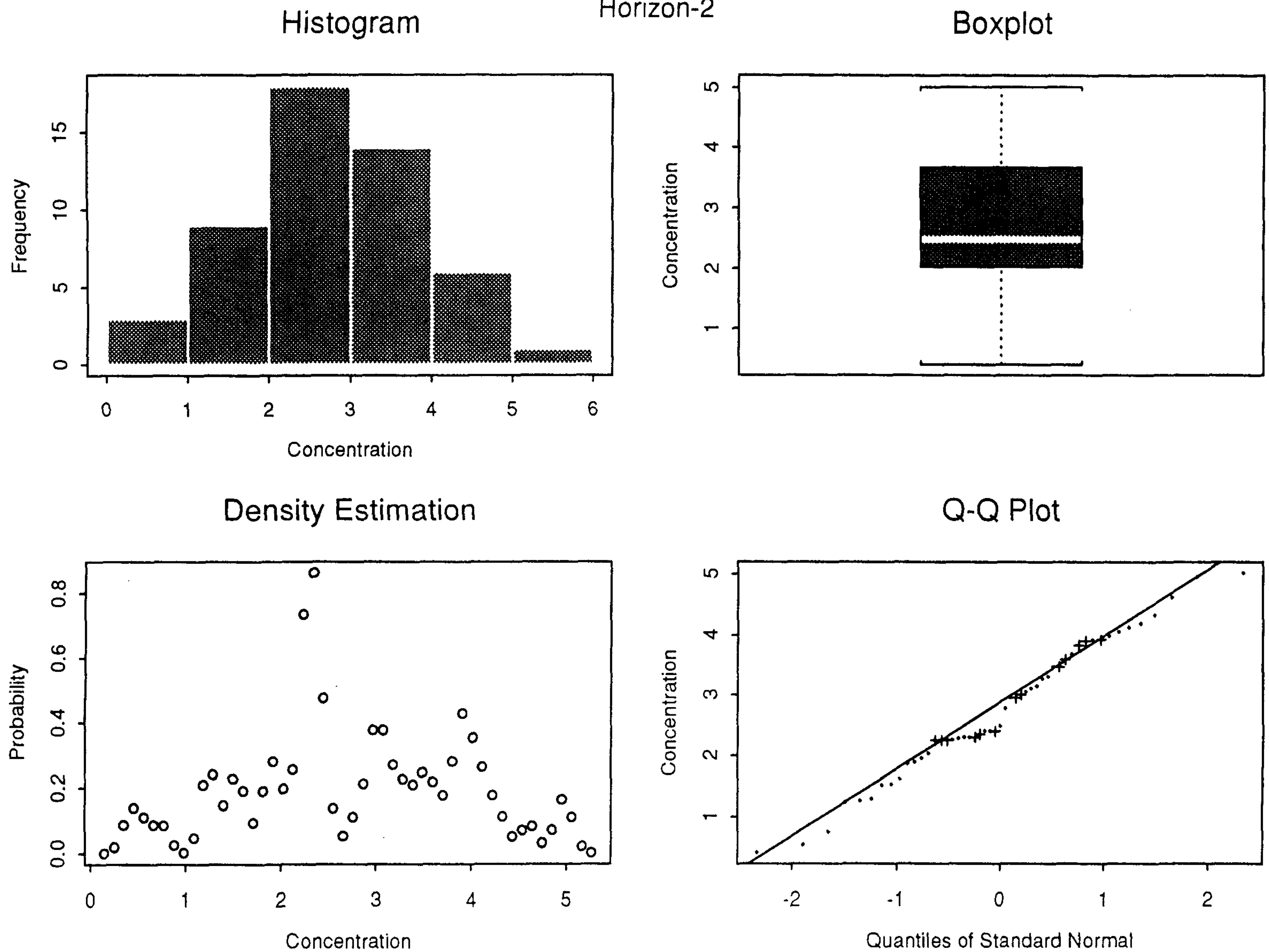


LOG-Phenanthrene
Horizon-2
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

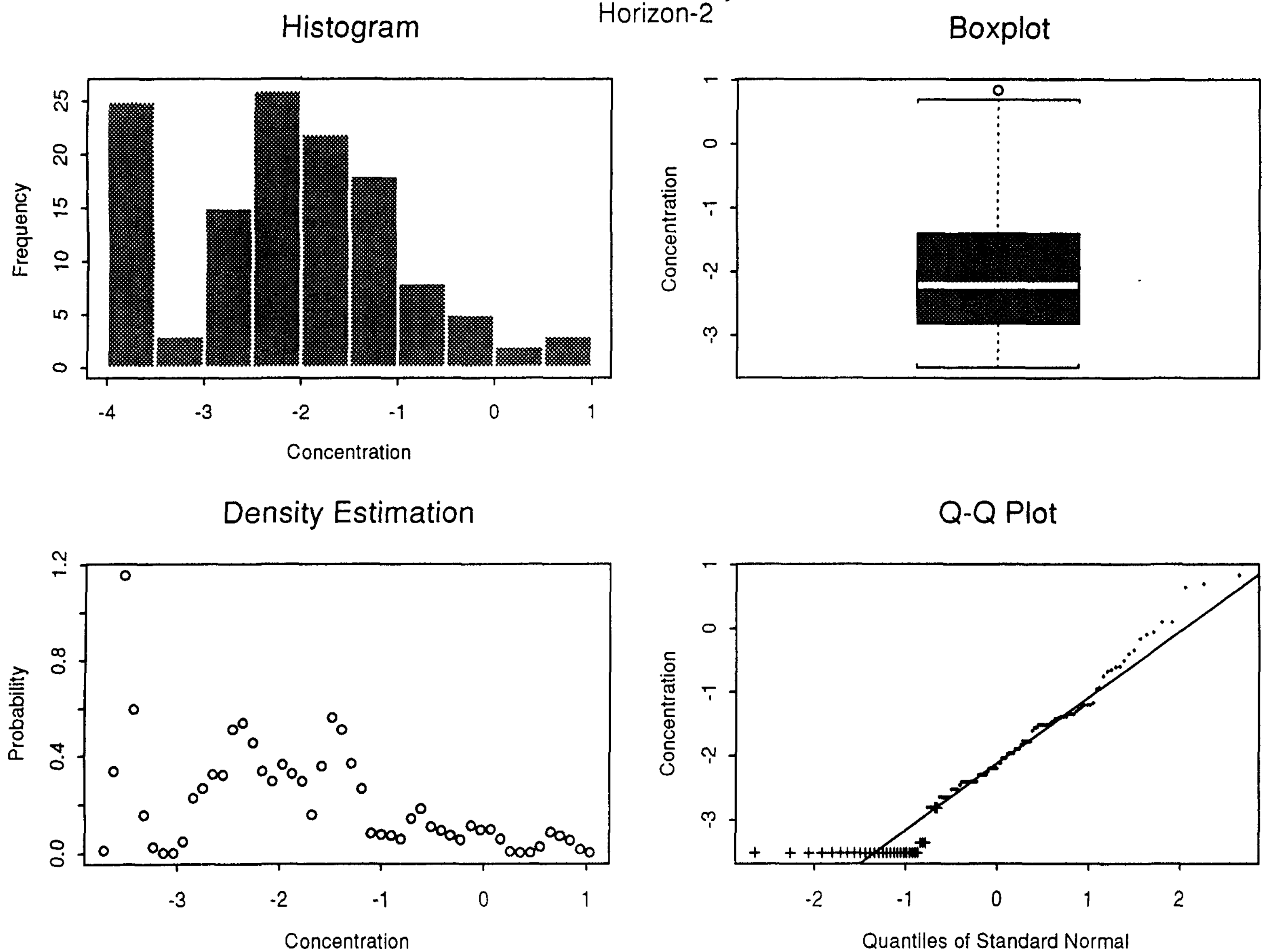
LOG-Naphthalene
Horizon-2



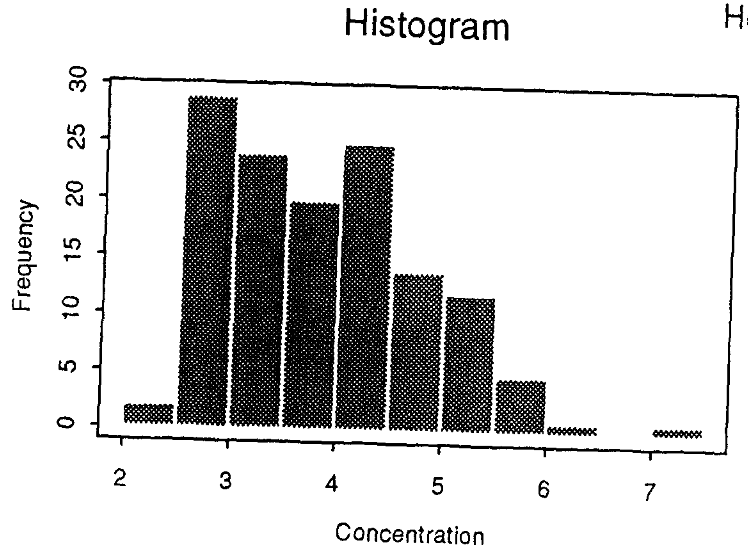
LOG-Methoxychlor
Horizon-2

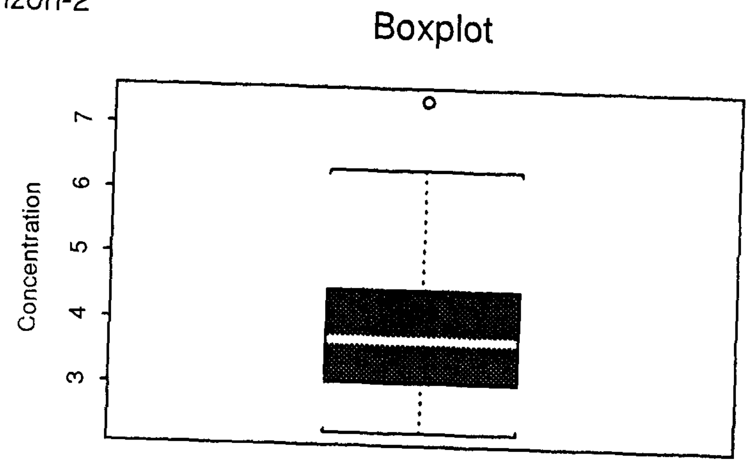


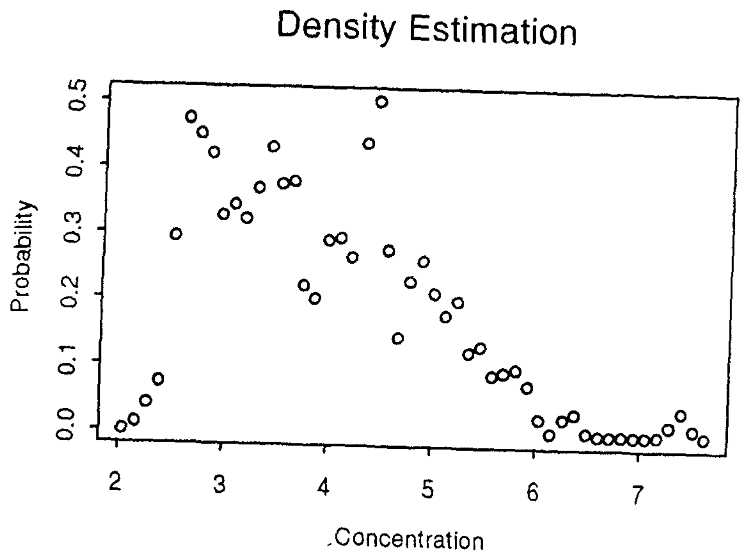
LOG-Mercury
Horizon-2

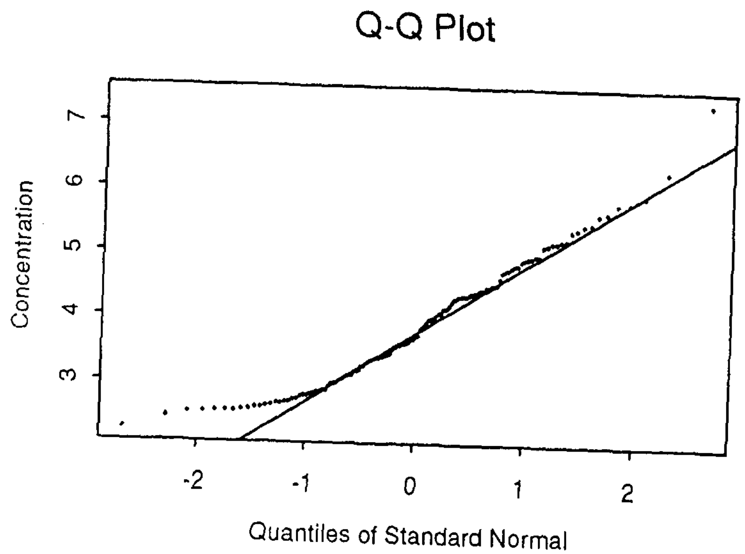


LOG-Lead
Horizon-2

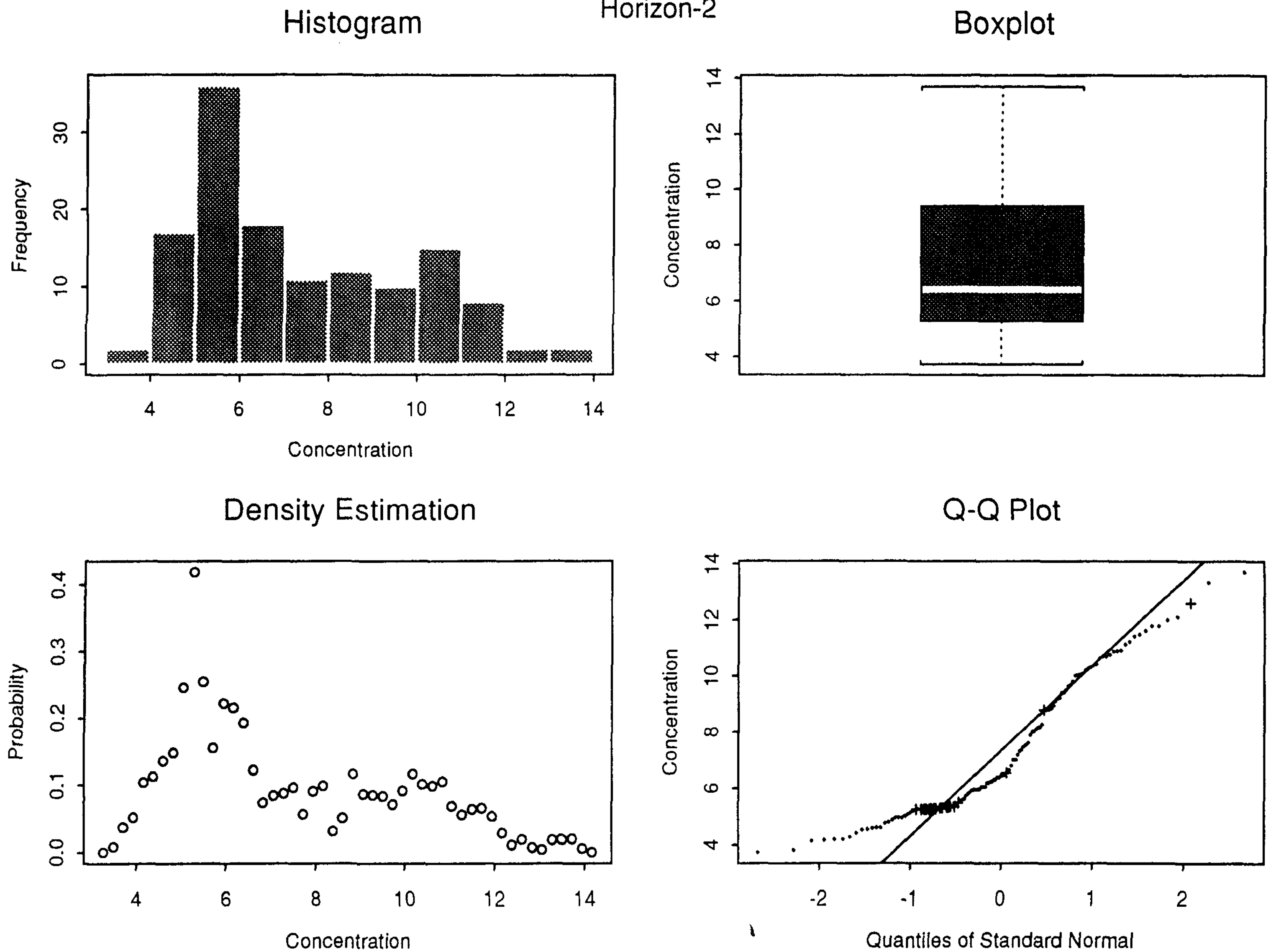




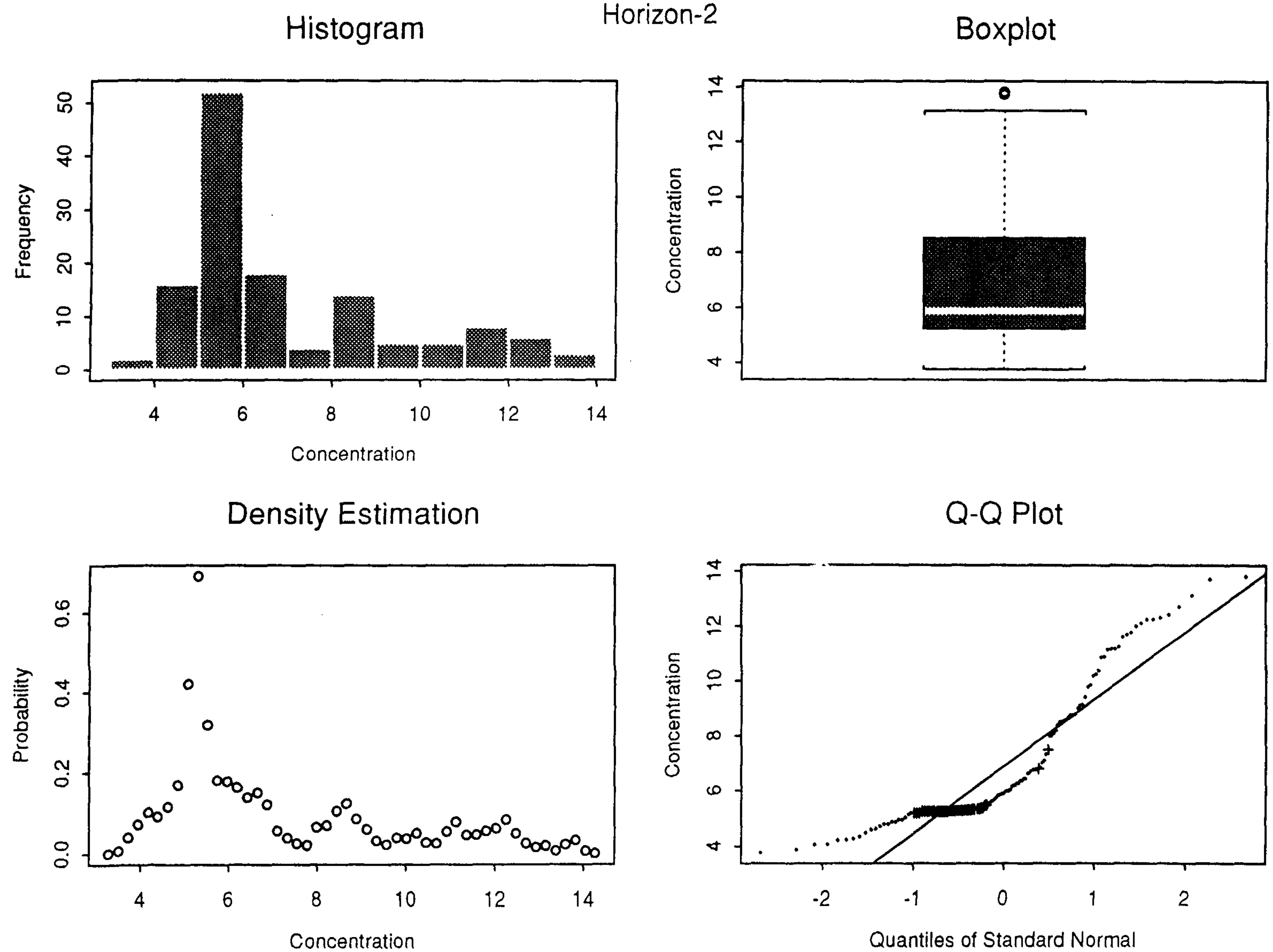


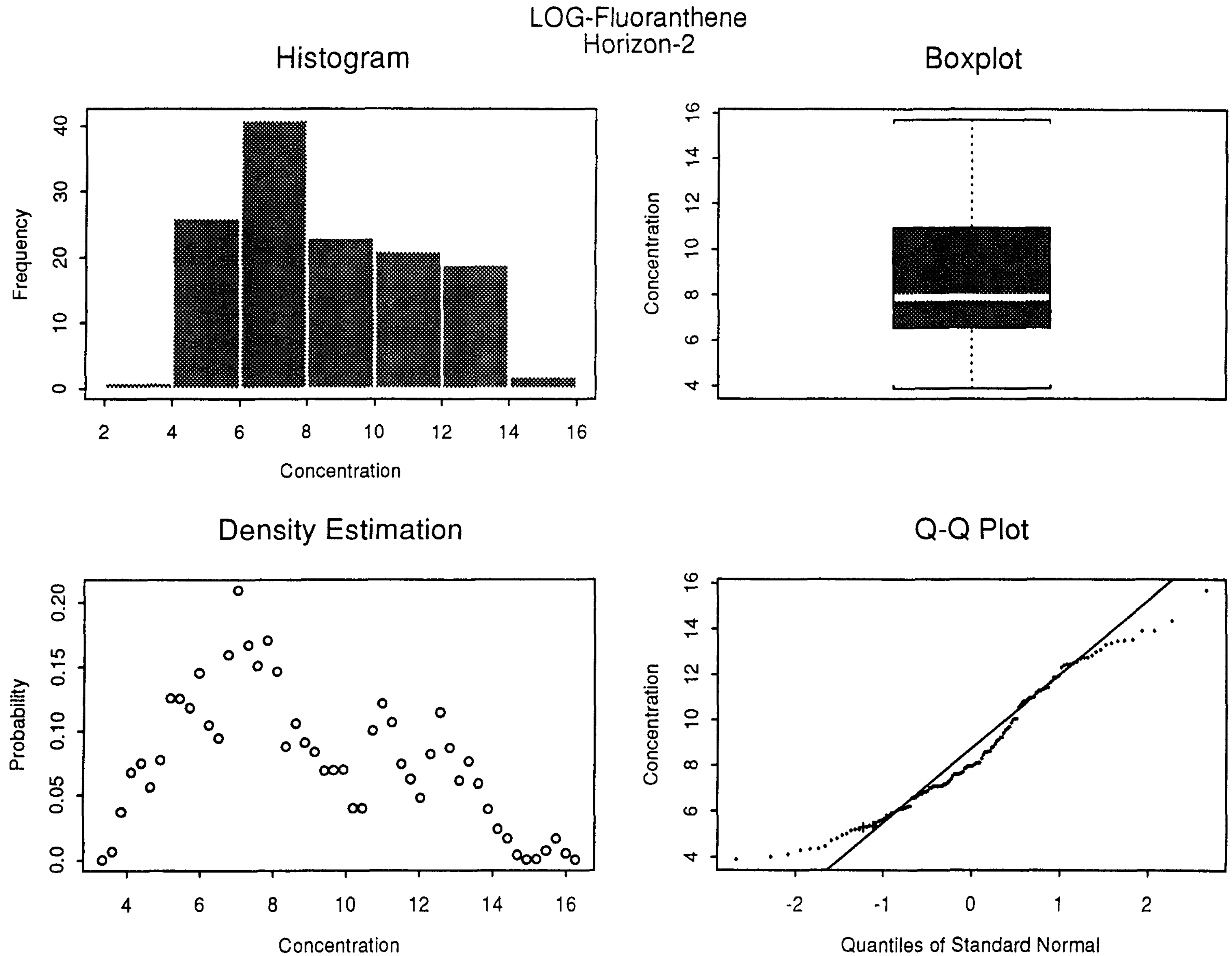


LOG-Indeno(1,2,3-cd)pyrene
Horizon-2



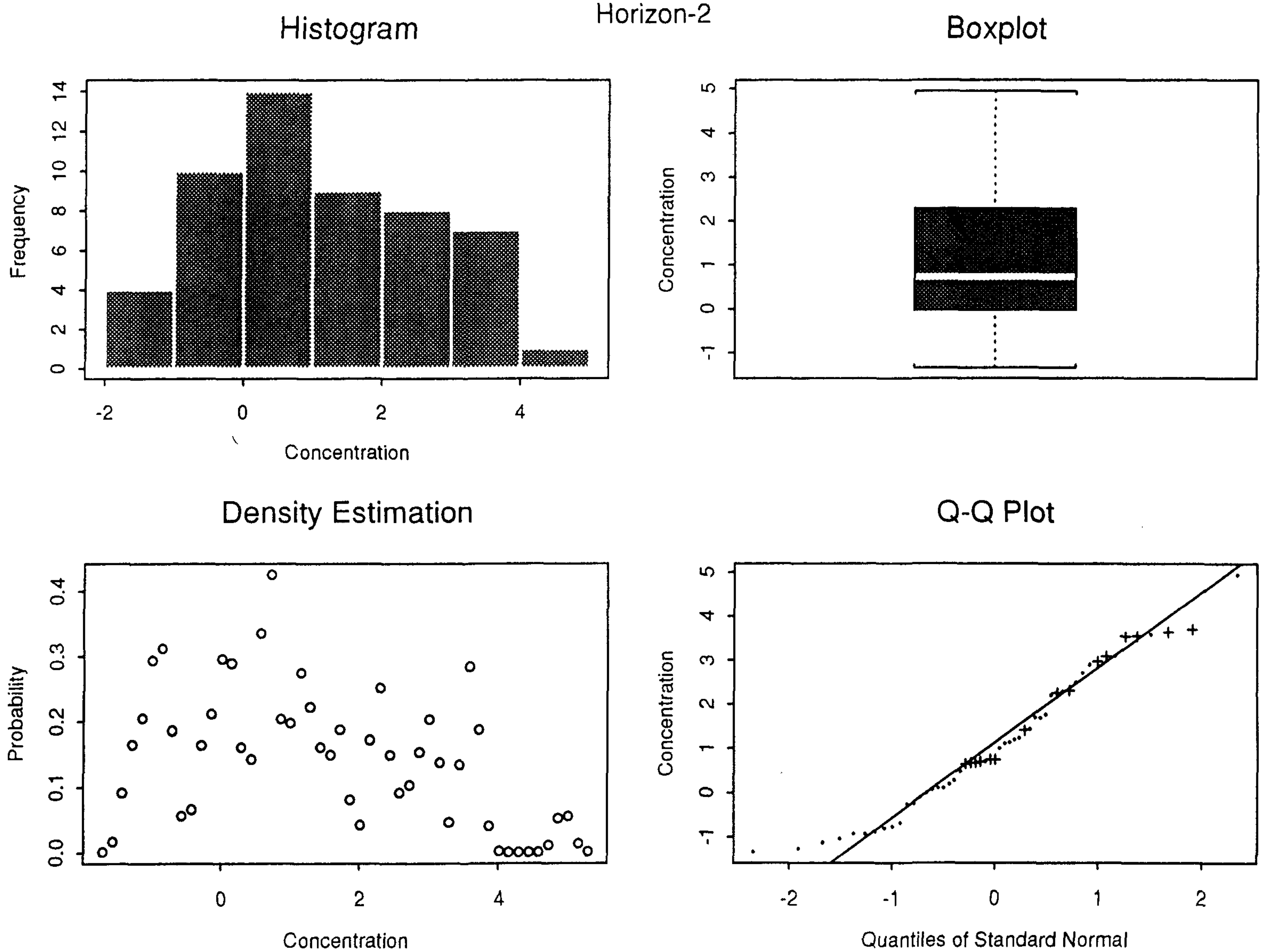
LOG-Fluorene
Horizon-2

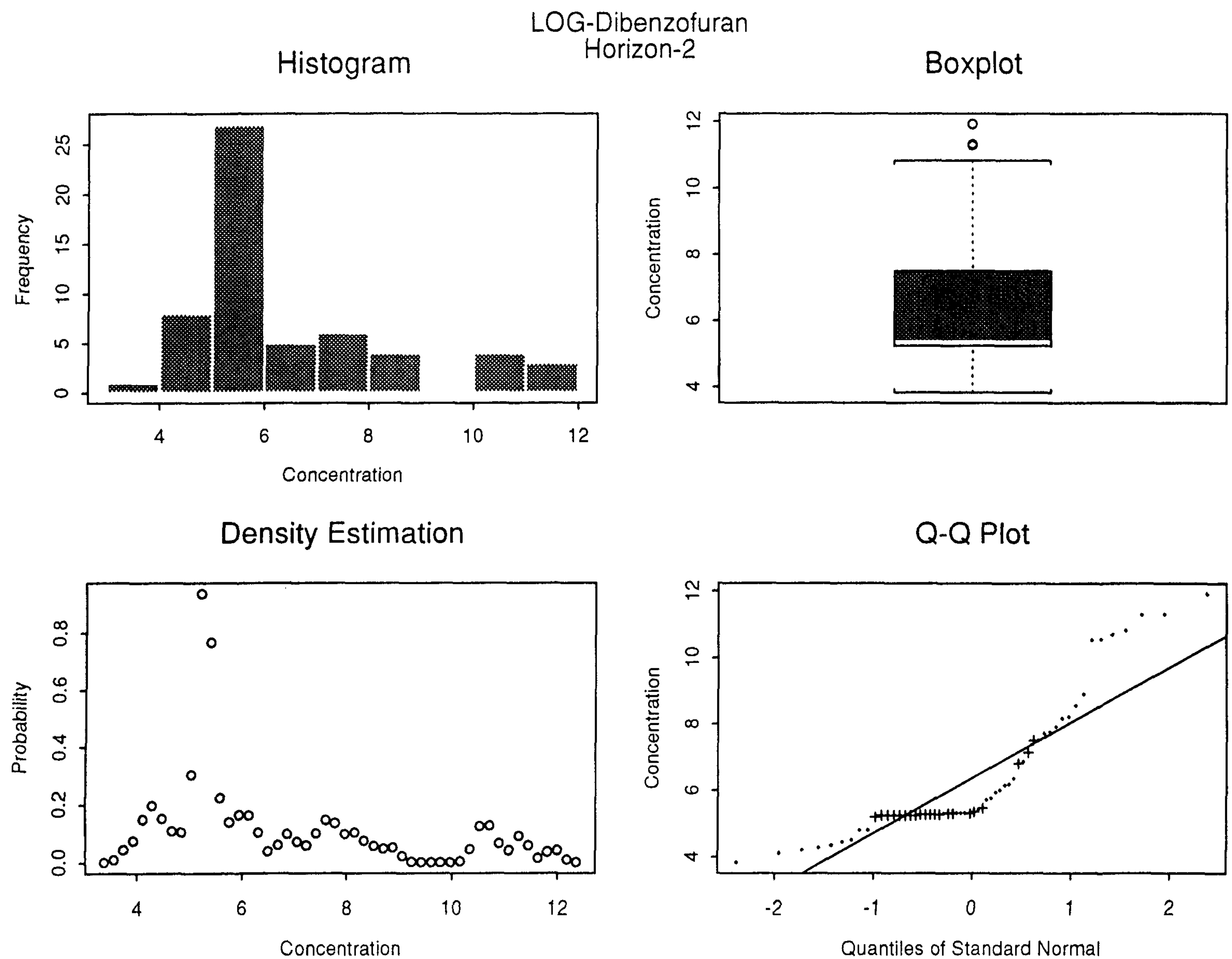


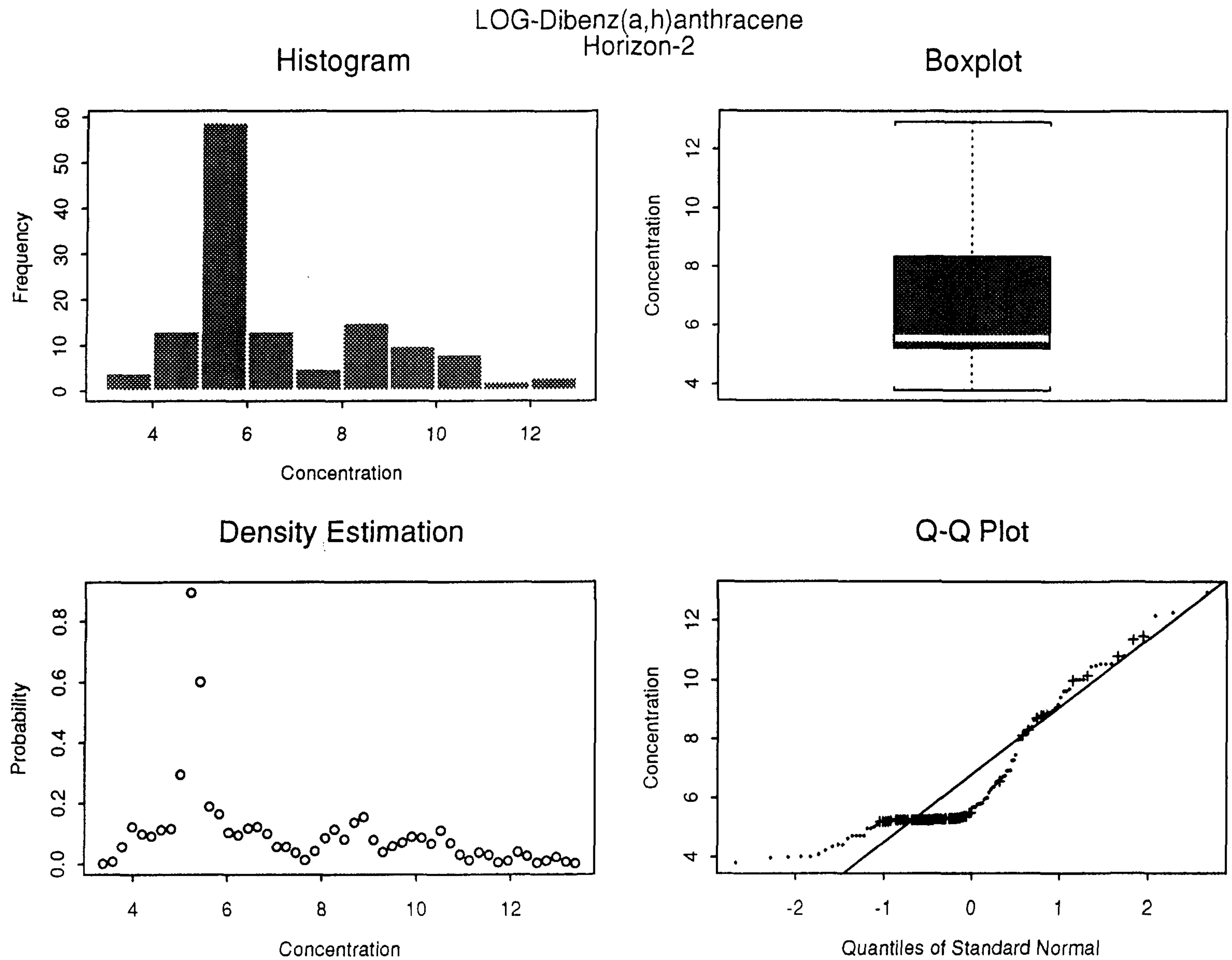


LOG-Fluoranthene
Horizon-2
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

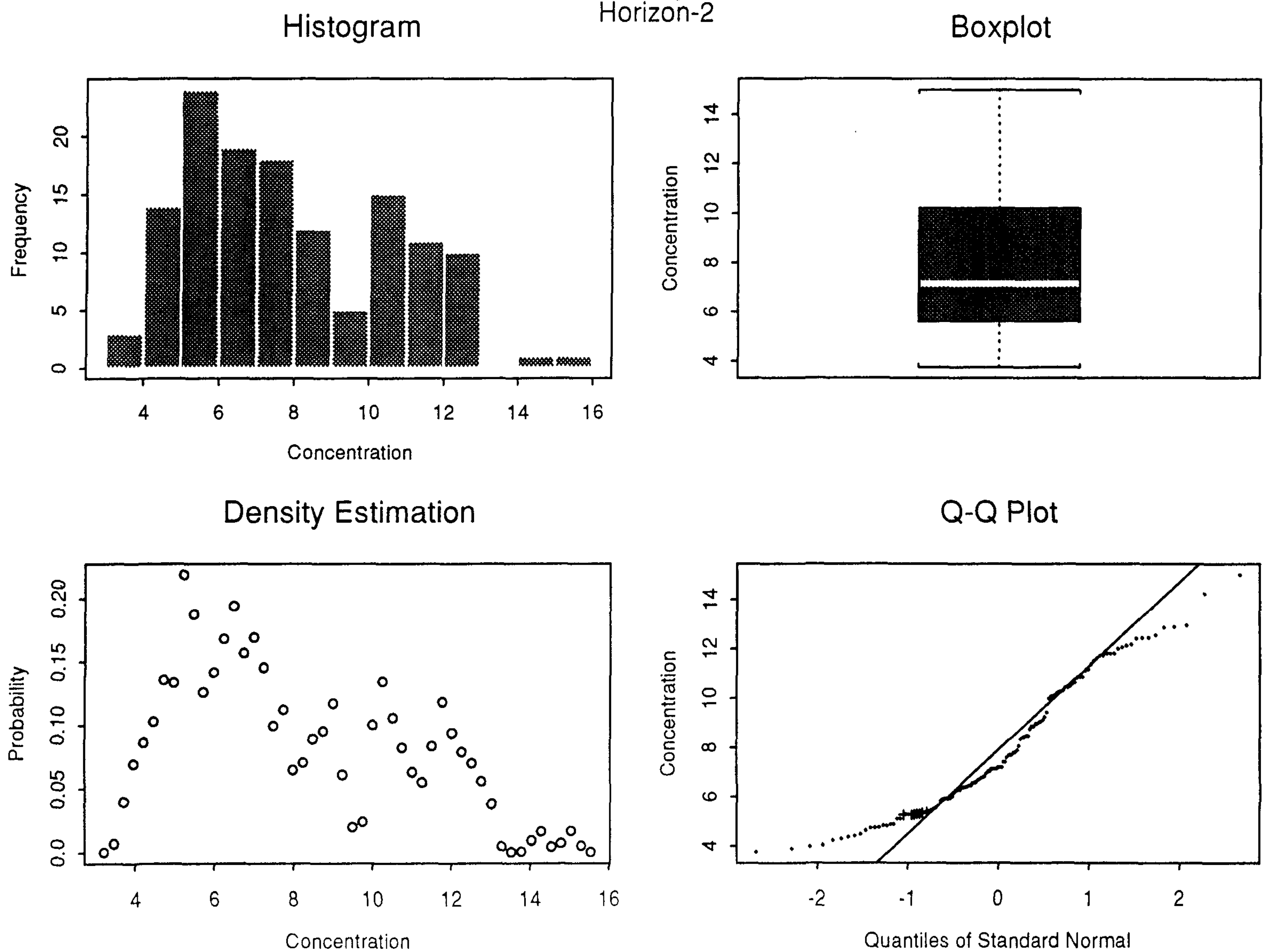
LOG-Dieldrin
Horizon-2

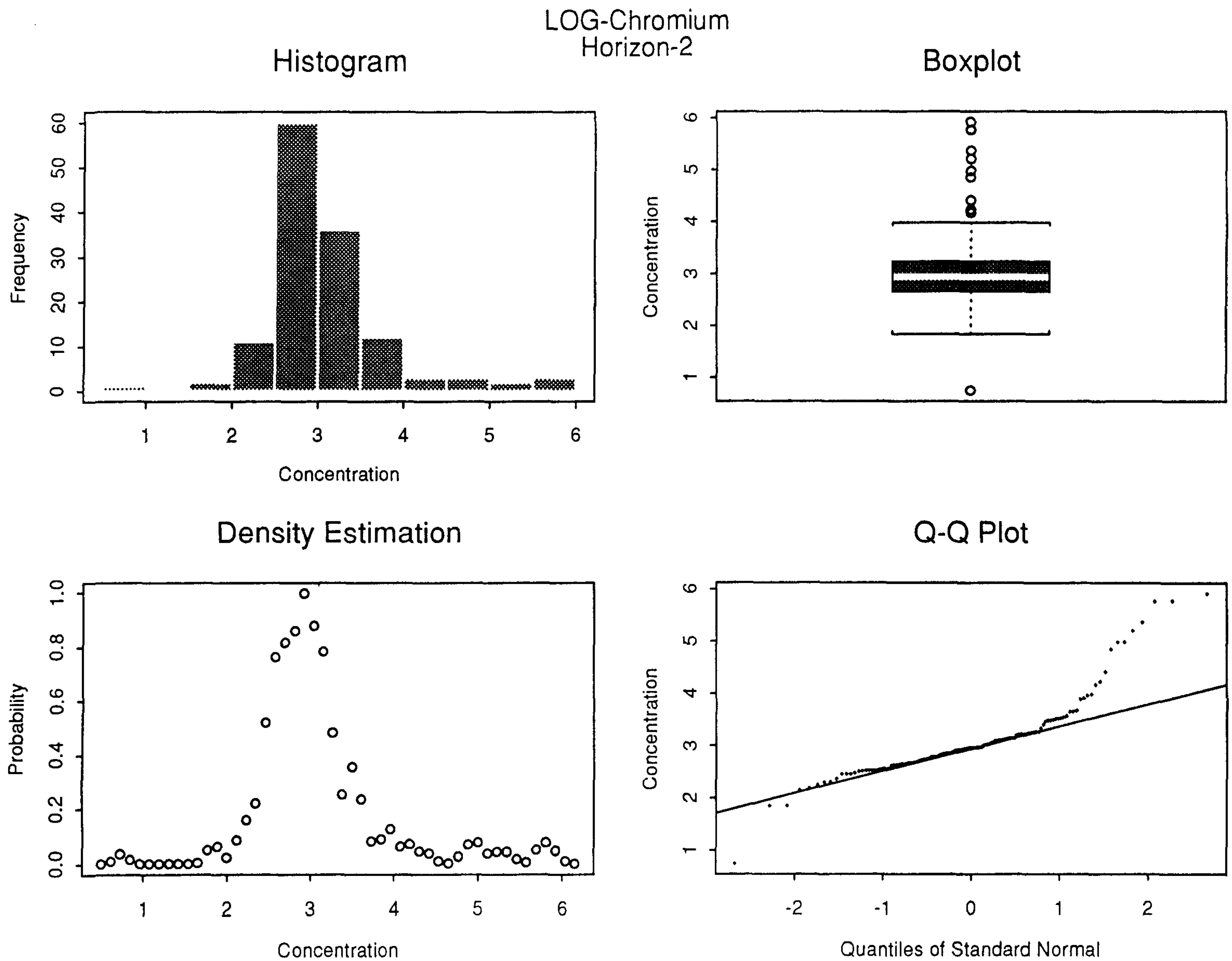


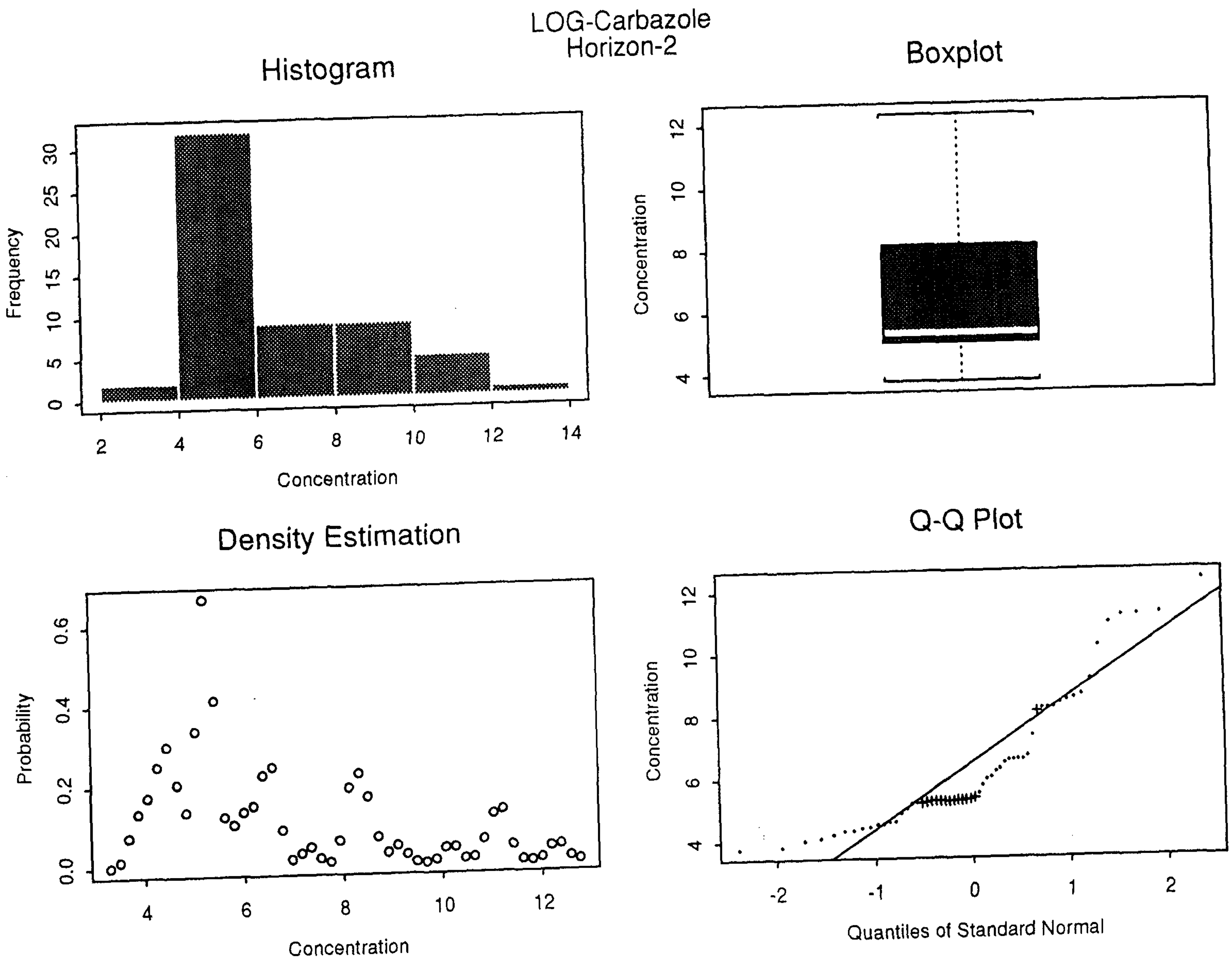

LOG-Dibenzofuran
Horizon-2
Histogram
Frequency
0
5
10
15
20
25
4
6
8
10
12
Concentration
Boxplot
Concentration
4
6
8
10
12
Density Estimation
Probability
0.0
0.2
0.4
0.6
0.8
4
6
8
10
12
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
-2
-1
0
1
2
Quantiles of Standard Normal


LOG-Dibenz(a,h)anthracene
Horizon-2
Histogram
Frequency
Concentration
Boxplot
Concentration
Density Estimation
Probability
Concentration
Q-Q Plot
Concentration
Quantiles of Standard Normal

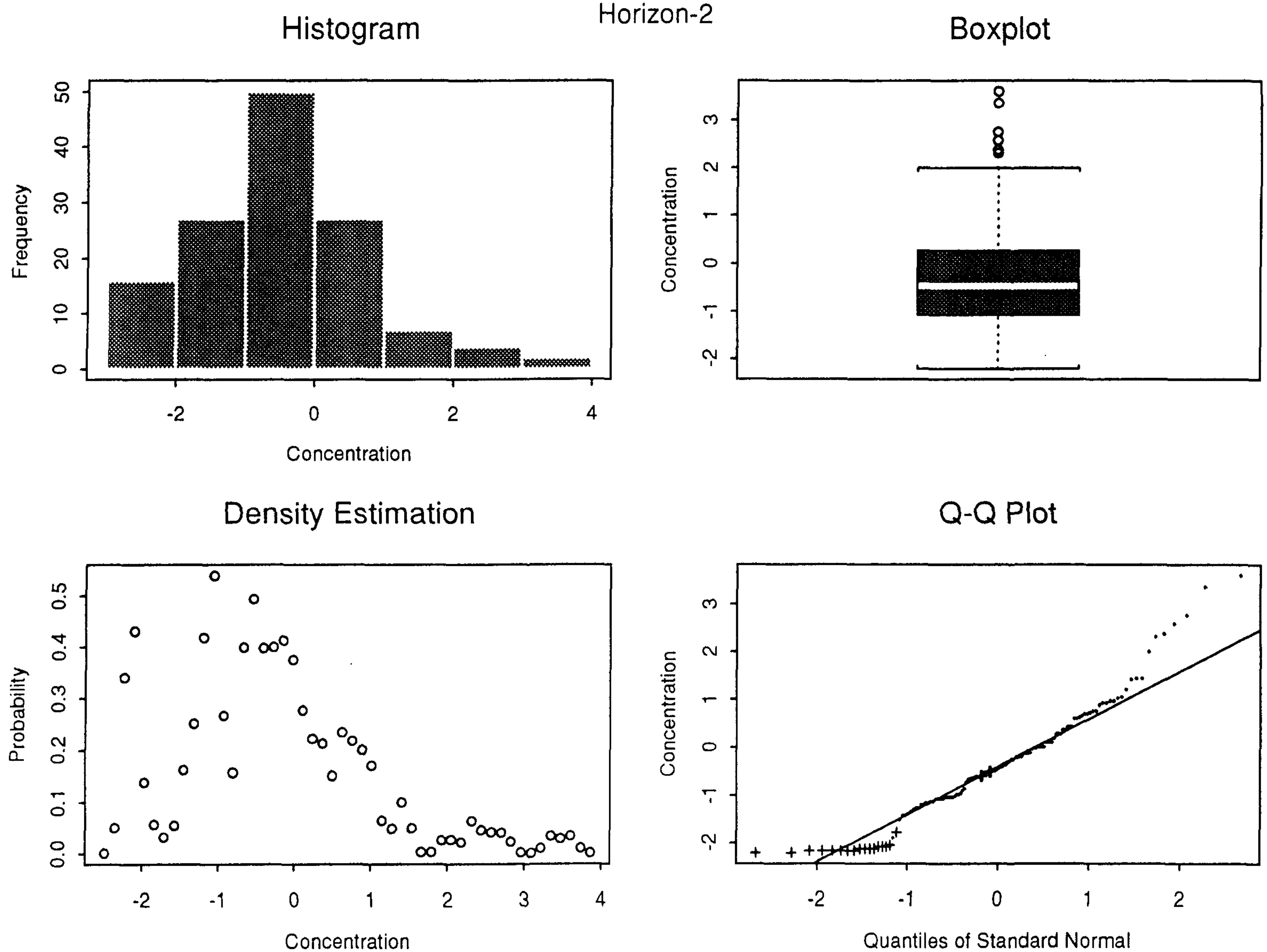
LOG-Chrysene
Horizon-2

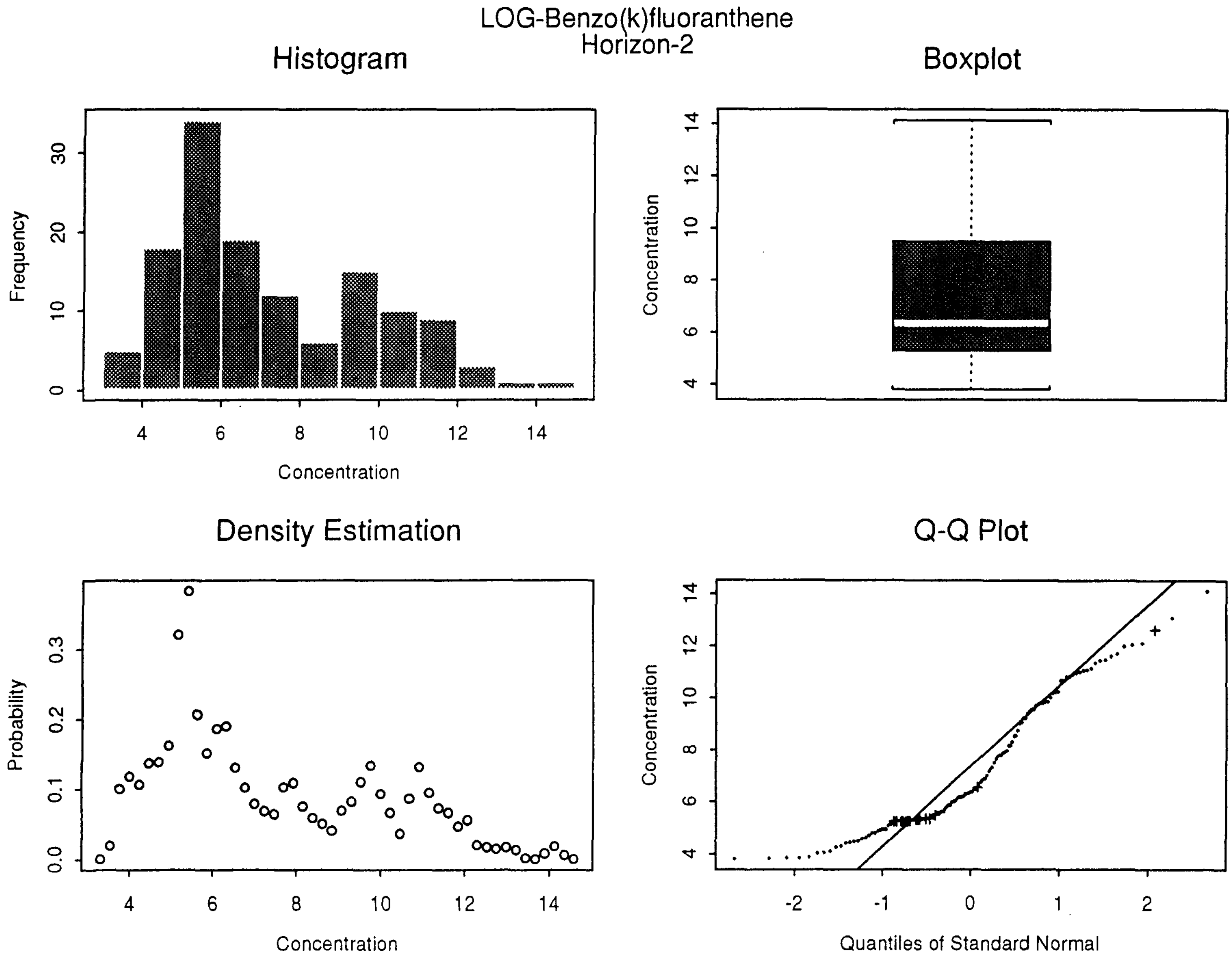



LOG-Chromium
Horizon-2
Histogram
Frequency
0
10
20
30
40
50
60
1
2
3
4
5
6
Concentration
Boxplot
Concentration
1
2
3
4
5
6
Density Estimation
Probability
0.0
0.2
0.4
0.6
0.8
1.0
1
2
3
4
5
6
Concentration
Q-Q Plot
Concentration
1
2
3
4
5
6
-2
-1
0
1
2
Quantiles of Standard Normal

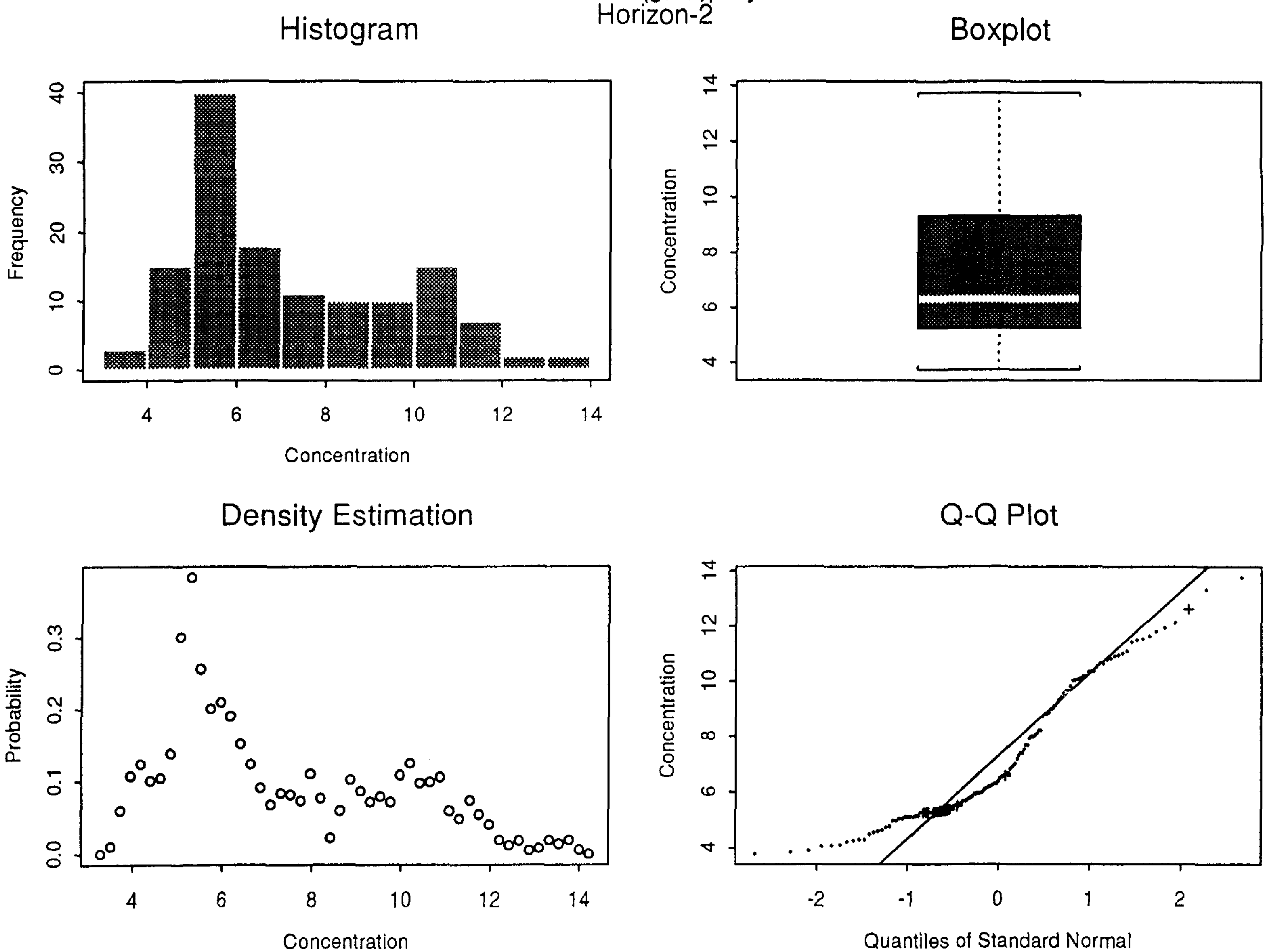

LOG-Carbazole
Horizon-2
Histogram
Frequency
0
5
10
15
20
25
30
2
4
6
8
10
12
14
Concentration
Boxplot
Concentration
4
6
8
10
12
Density Estimation
Probability
0.0
0.2
0.4
0.6
4
6
8
10
12
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
-2
-1
0
1
2
Quantiles of Standard Normal

LOG-Cadmium
Horizon-2

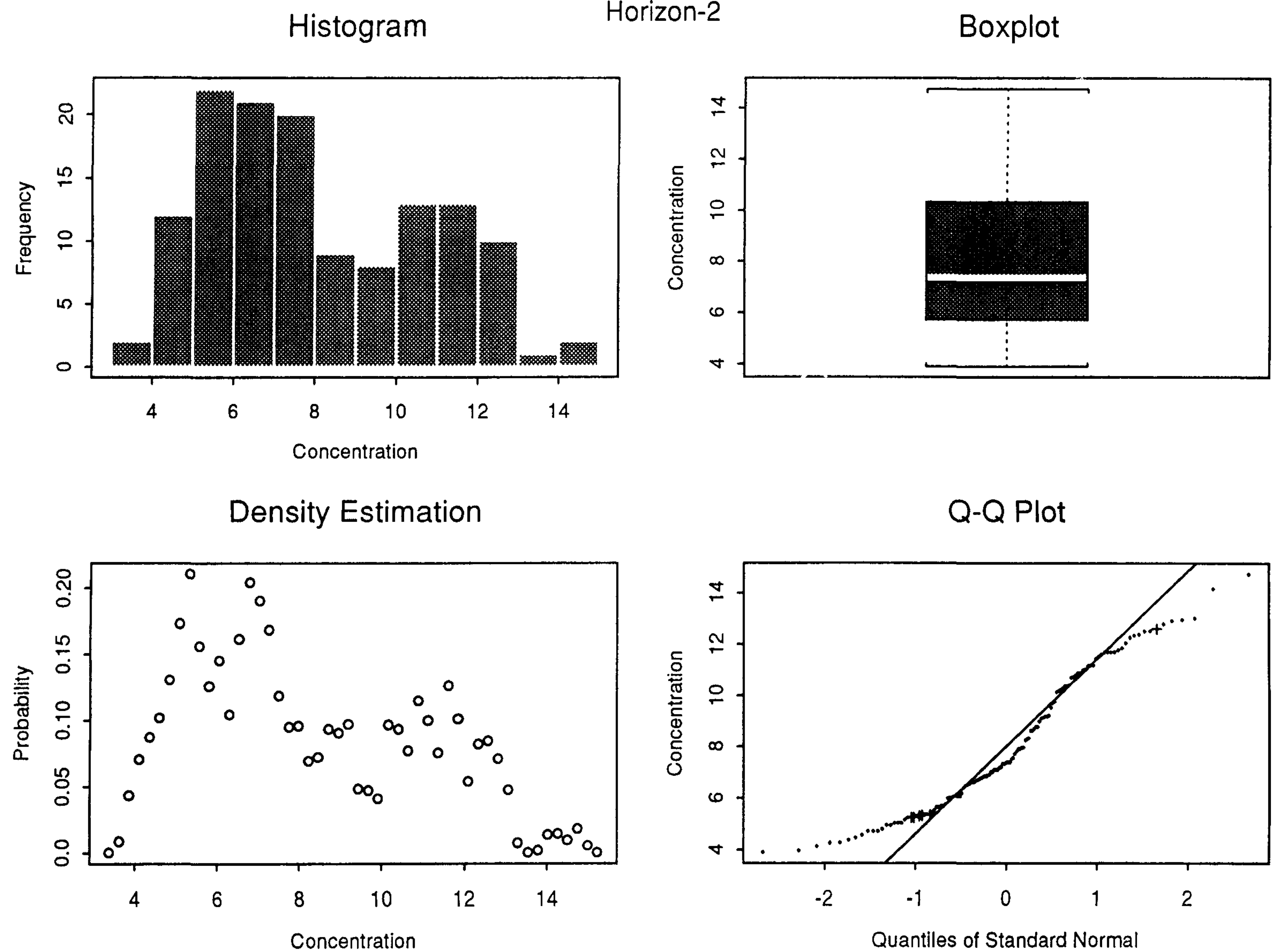



LOG-Benzo(k)fluoranthene
Horizon-2
Histogram
Frequency
0
10
20
30
4
6
8
10
12
14
Concentration
Boxplot
Concentration
4
6
8
10
12
14
Density Estimation
Probability
0.0
0.1
0.2
0.3
4
6
8
10
12
14
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
14
-2
-1
0
1
2
Quantiles of Standard Normal

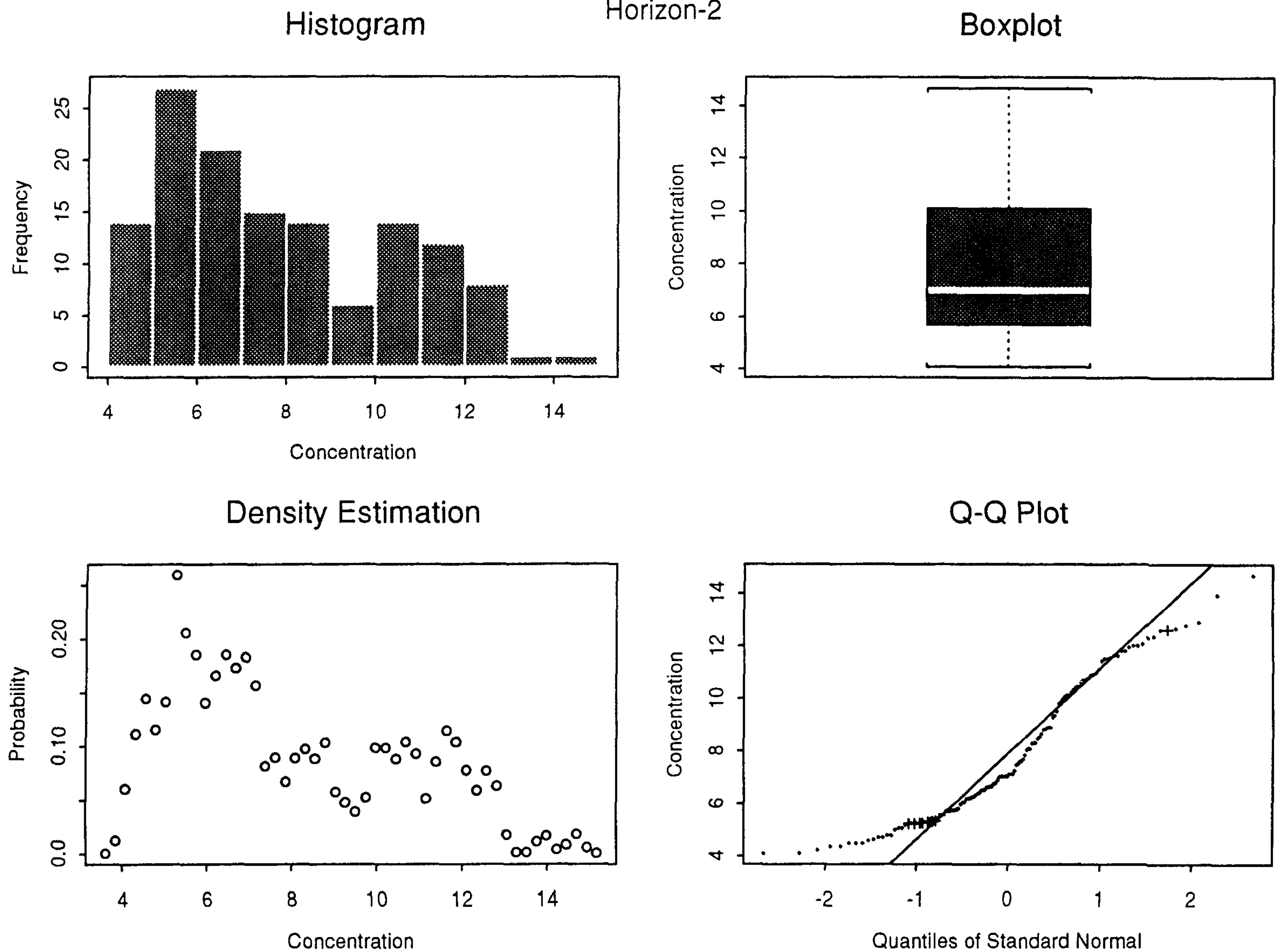
LOG-Benzo(g,h,i)perylene
Horizon-2



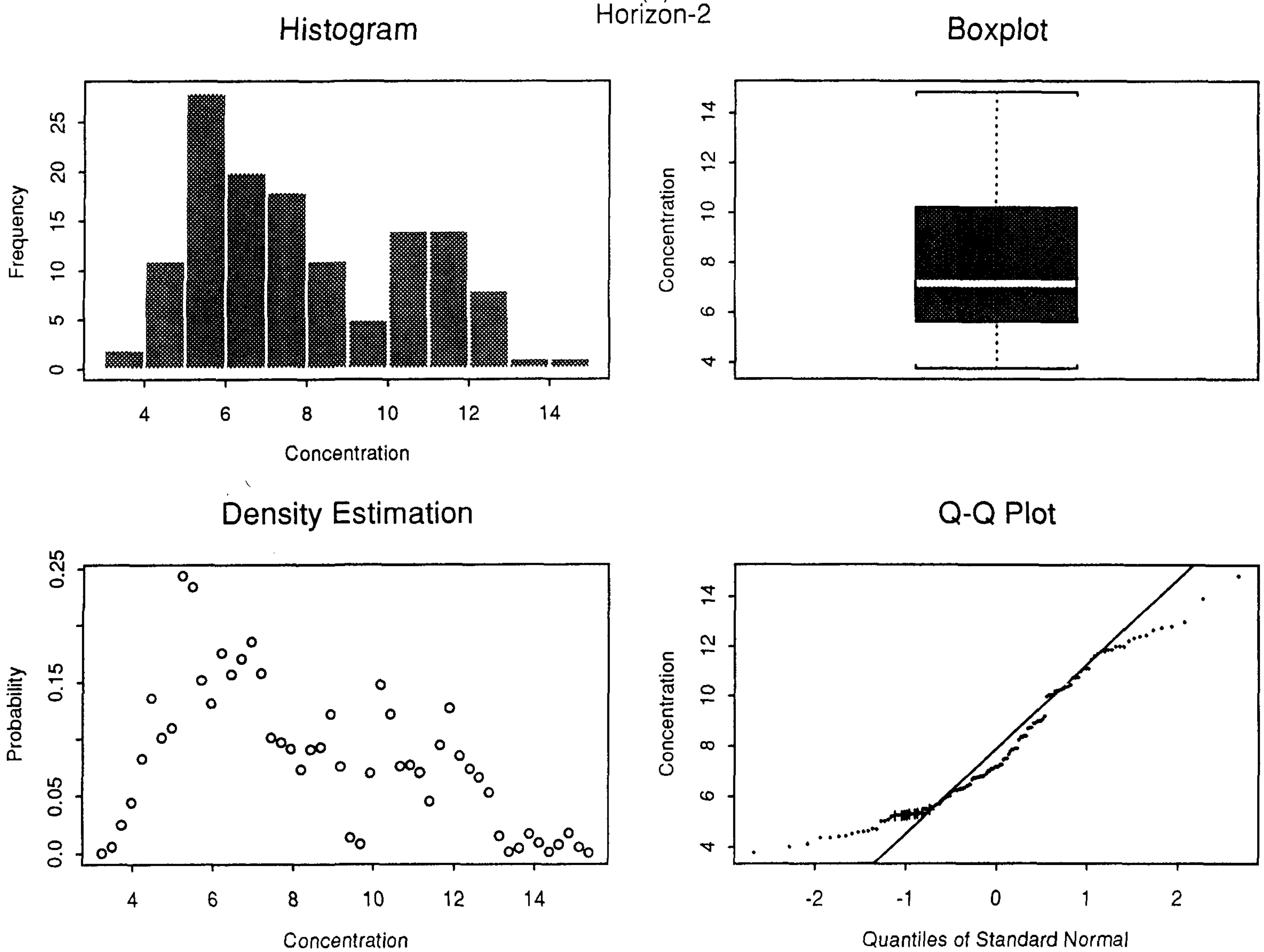
LOG-Benzo(b)fluoranthene
Horizon-2



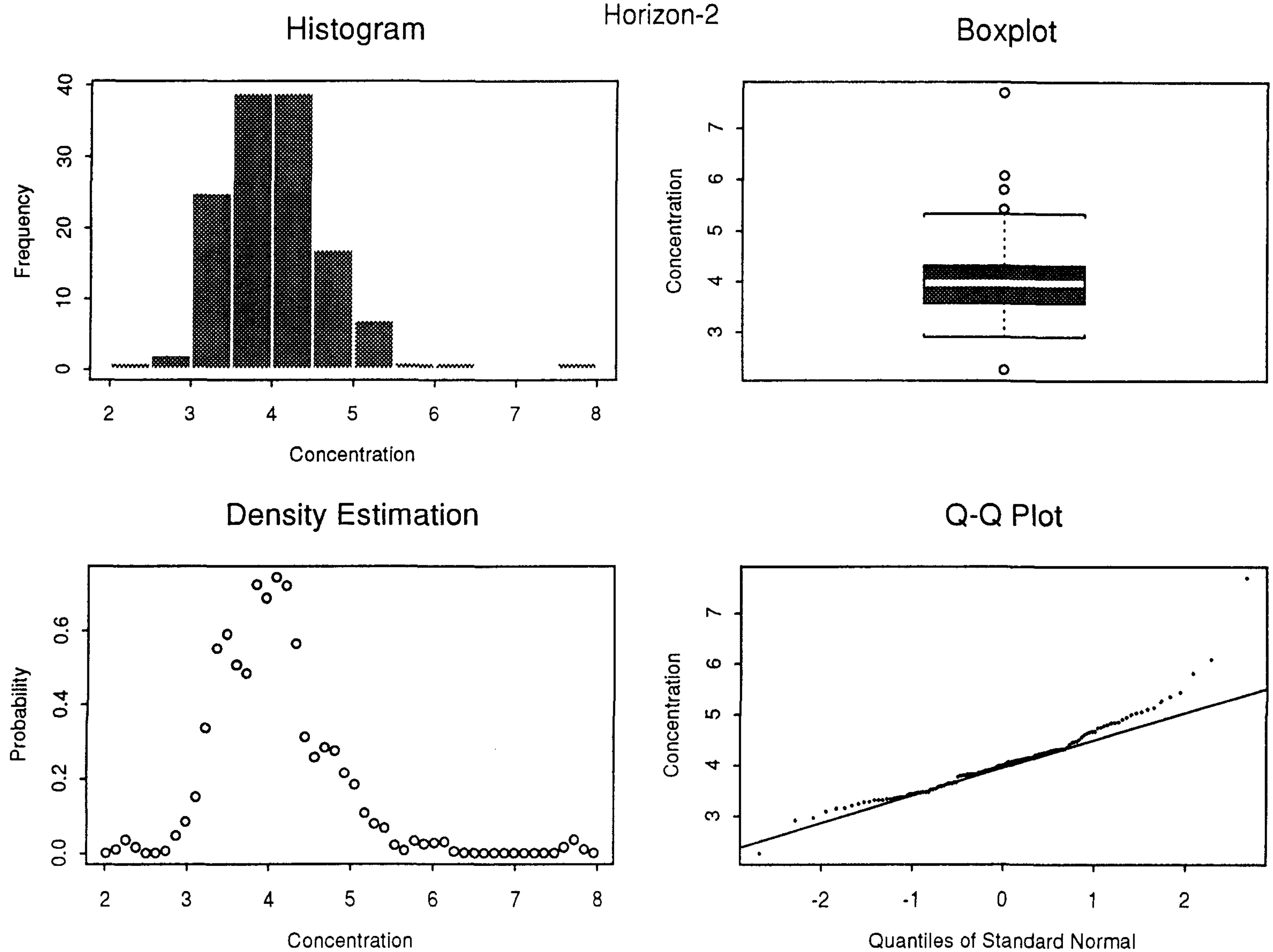
LOG-Benzo(a)pyrene
Horizon-2

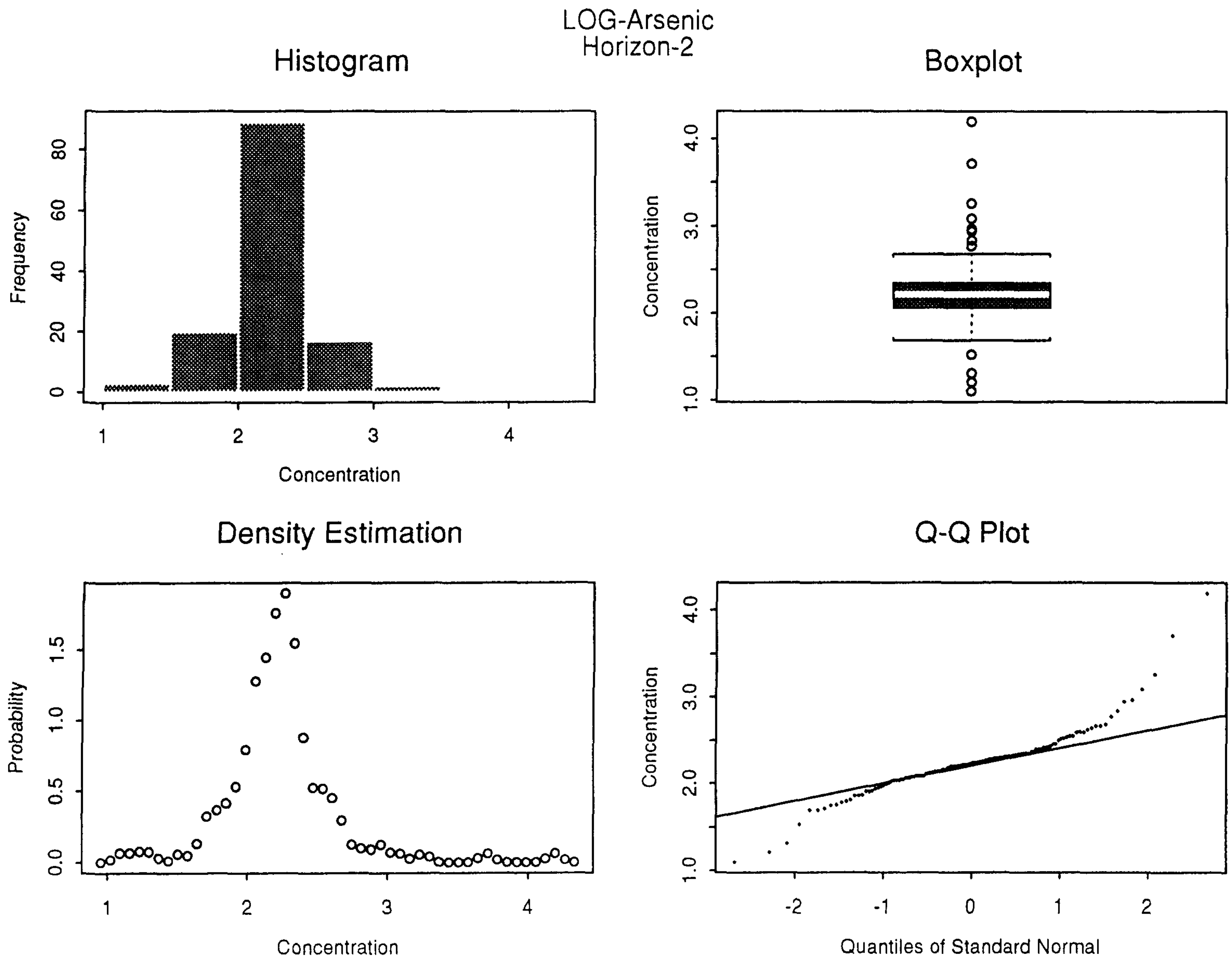


LOG-Benzo(a)Anthracene
Horizon-2

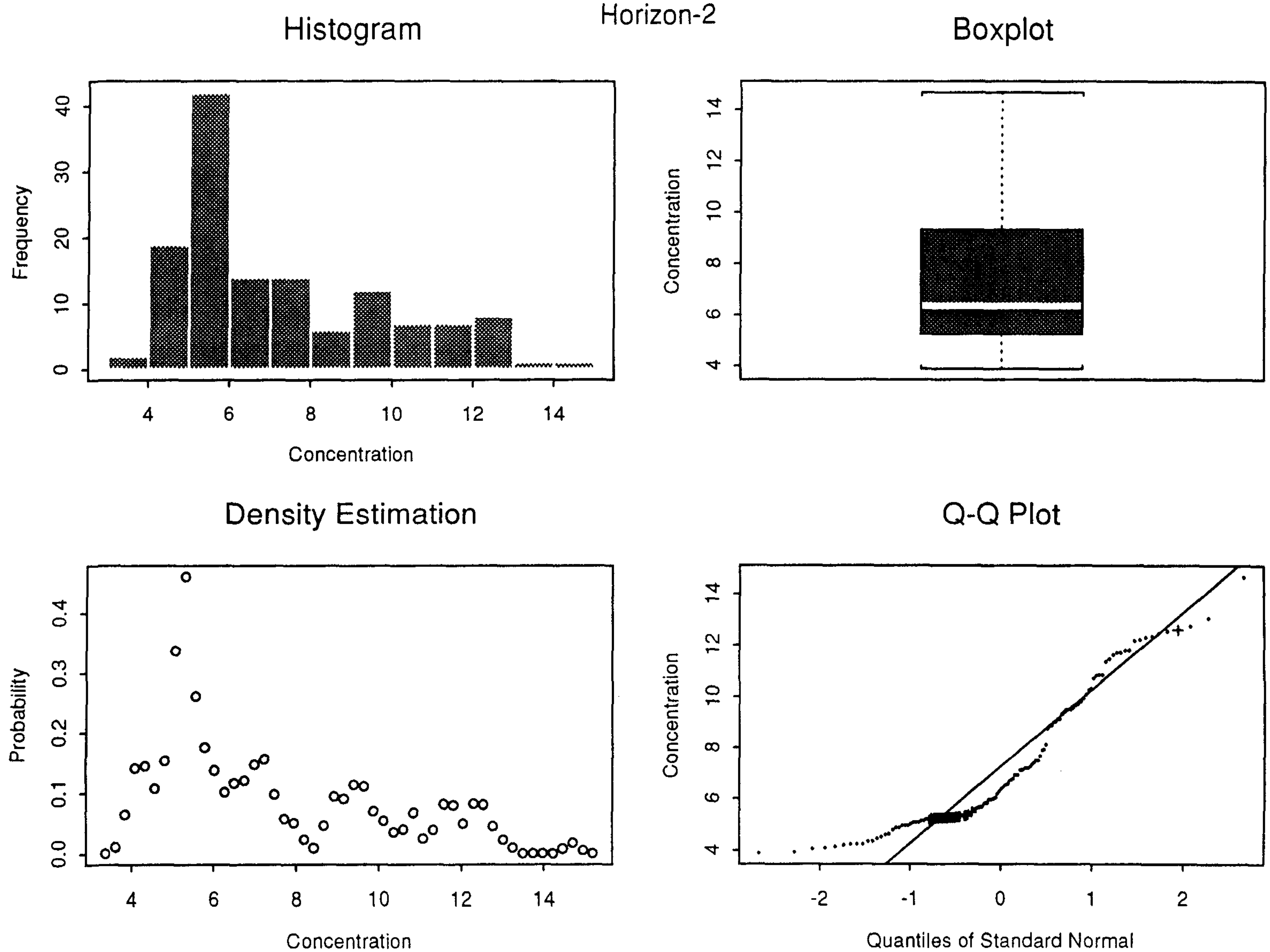


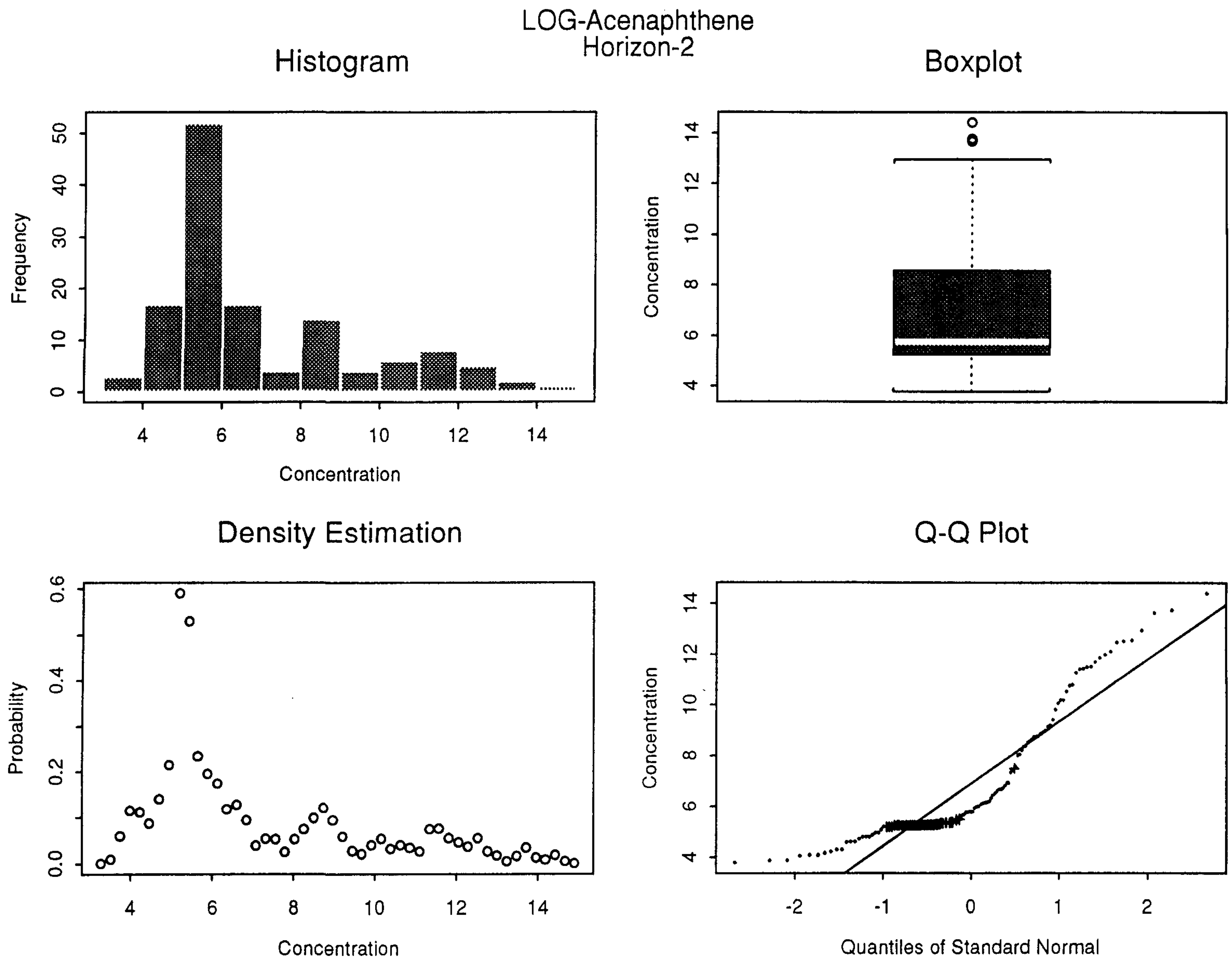
LOG-Barium
Horizon-2



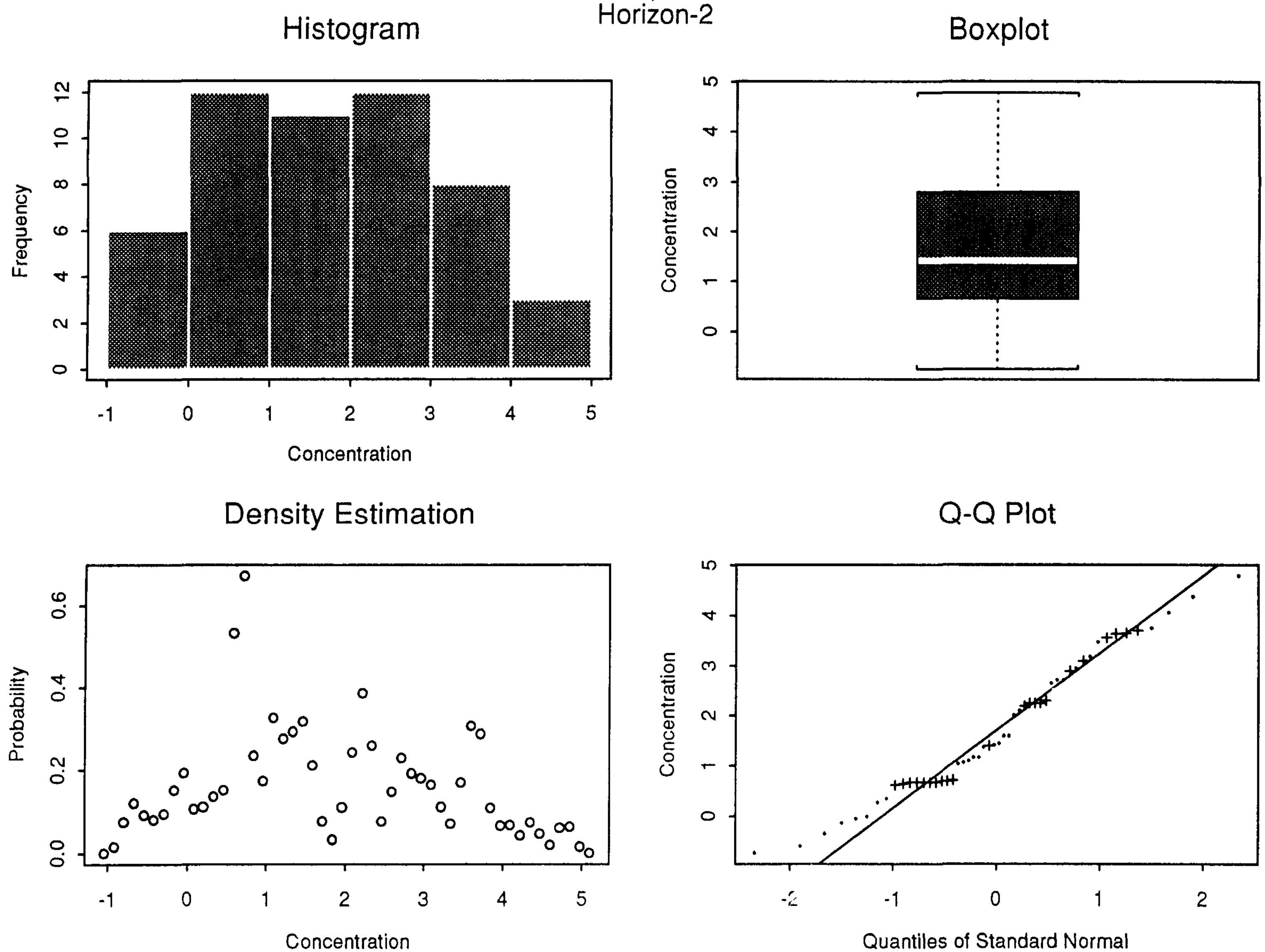

LOG-Arsenic
Horizon-2
Histogram
Frequency
0
20
40
60
80
1
2
3
4
Concentration
Boxplot
Concentration
1.0
2.0
3.0
4.0
Density Estimation
Probability
0.0
0.5
1.0
1.5
1
2
3
4
Concentration
Q-Q Plot
Concentration
1.0
2.0
3.0
4.0
-2
-1
0
1
2
Quantiles of Standard Normal

LOG-Anthracene
Horizon-2

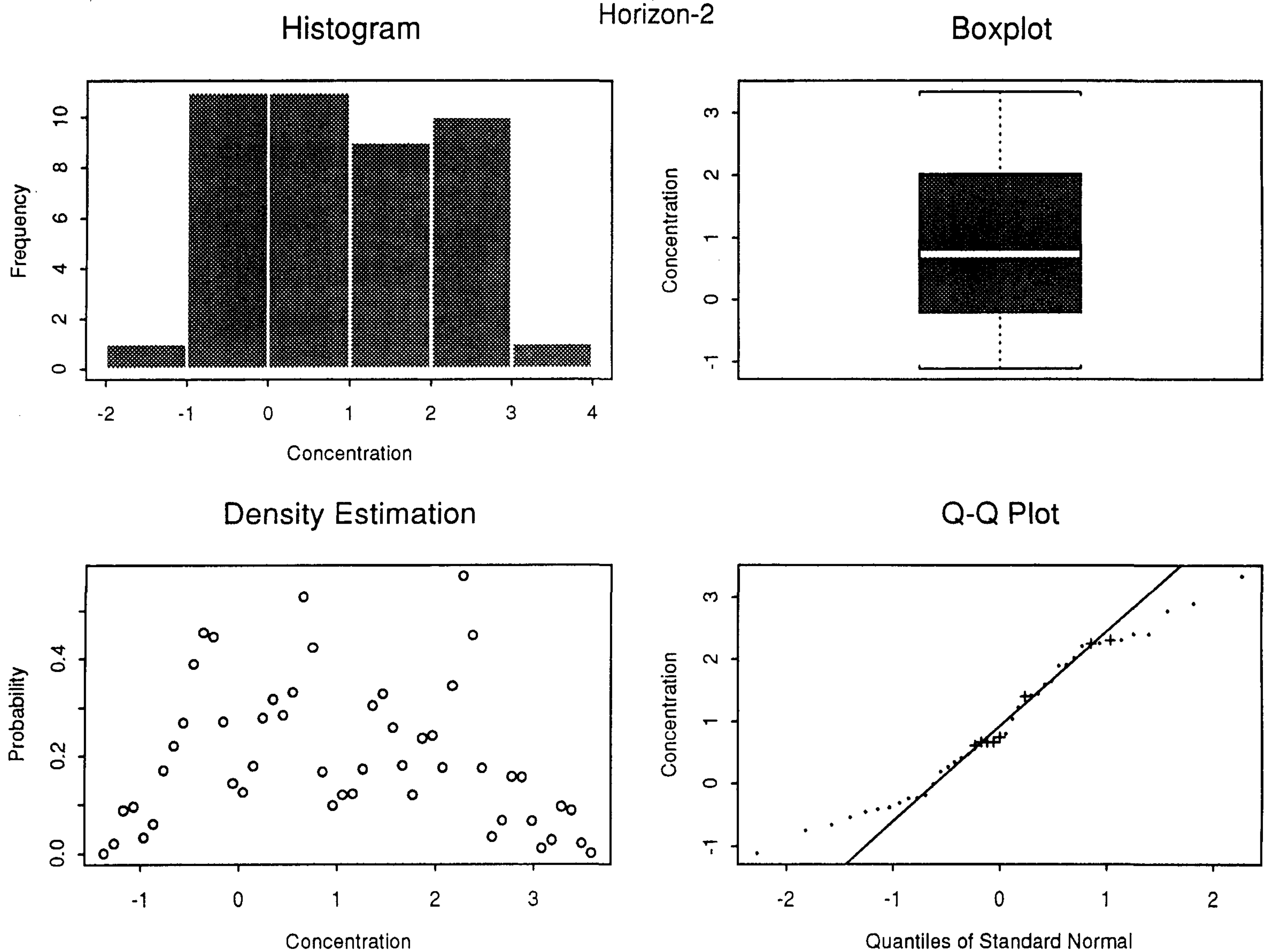



LOG-Acenaphthene
Horizon-2
Histogram
Frequency
0
10
20
30
40
50
4
6
8
10
12
14
Concentration
Boxplot
Concentration
4
6
8
10
12
14
Density Estimation
Probability
0.0
0.2
0.4
0.6
4
6
8
10
12
14
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
14
-2
-1
0
1
2
Quantiles of Standard Normal

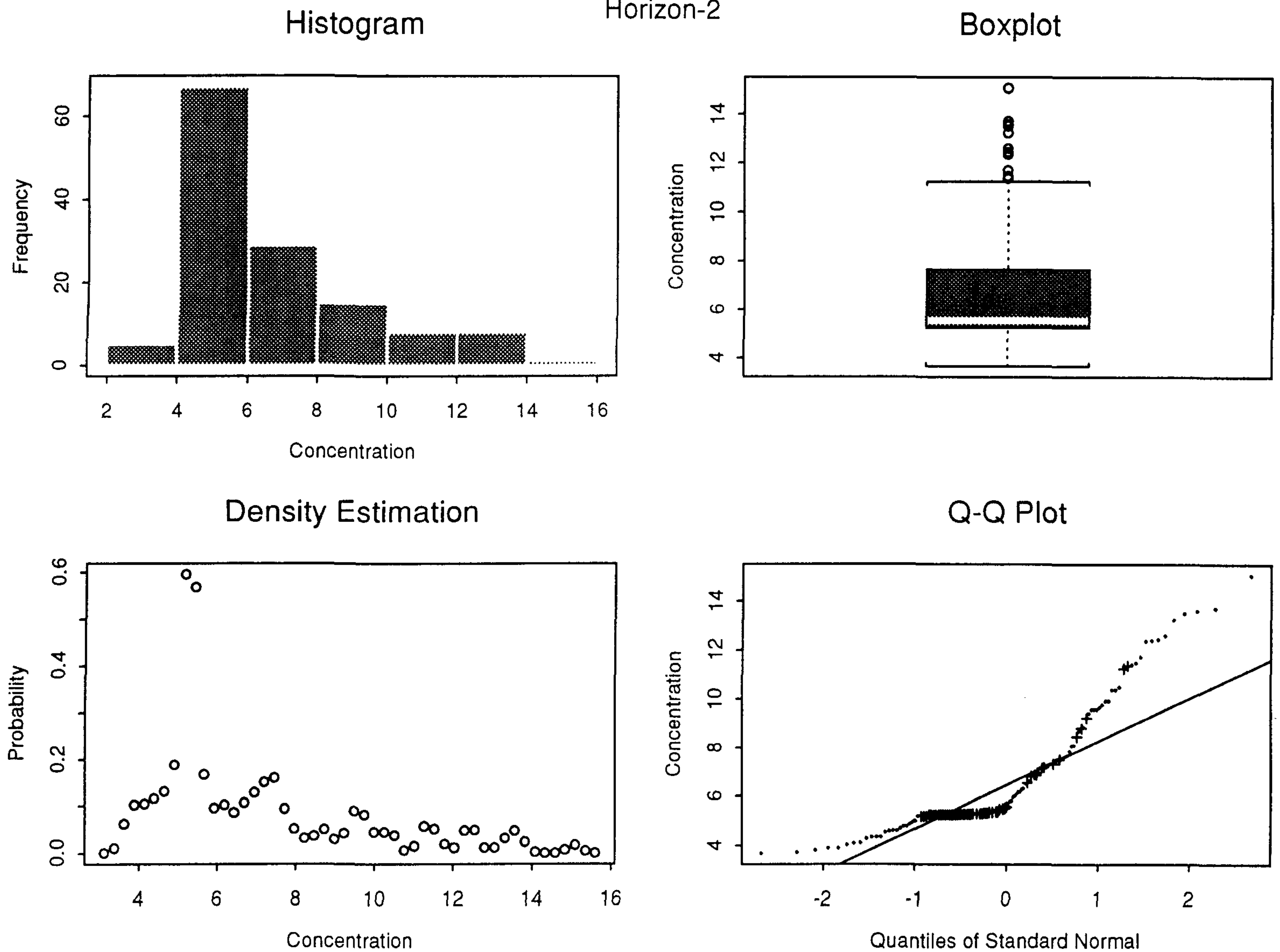
LOG-4,4'-DDT
Horizon-2

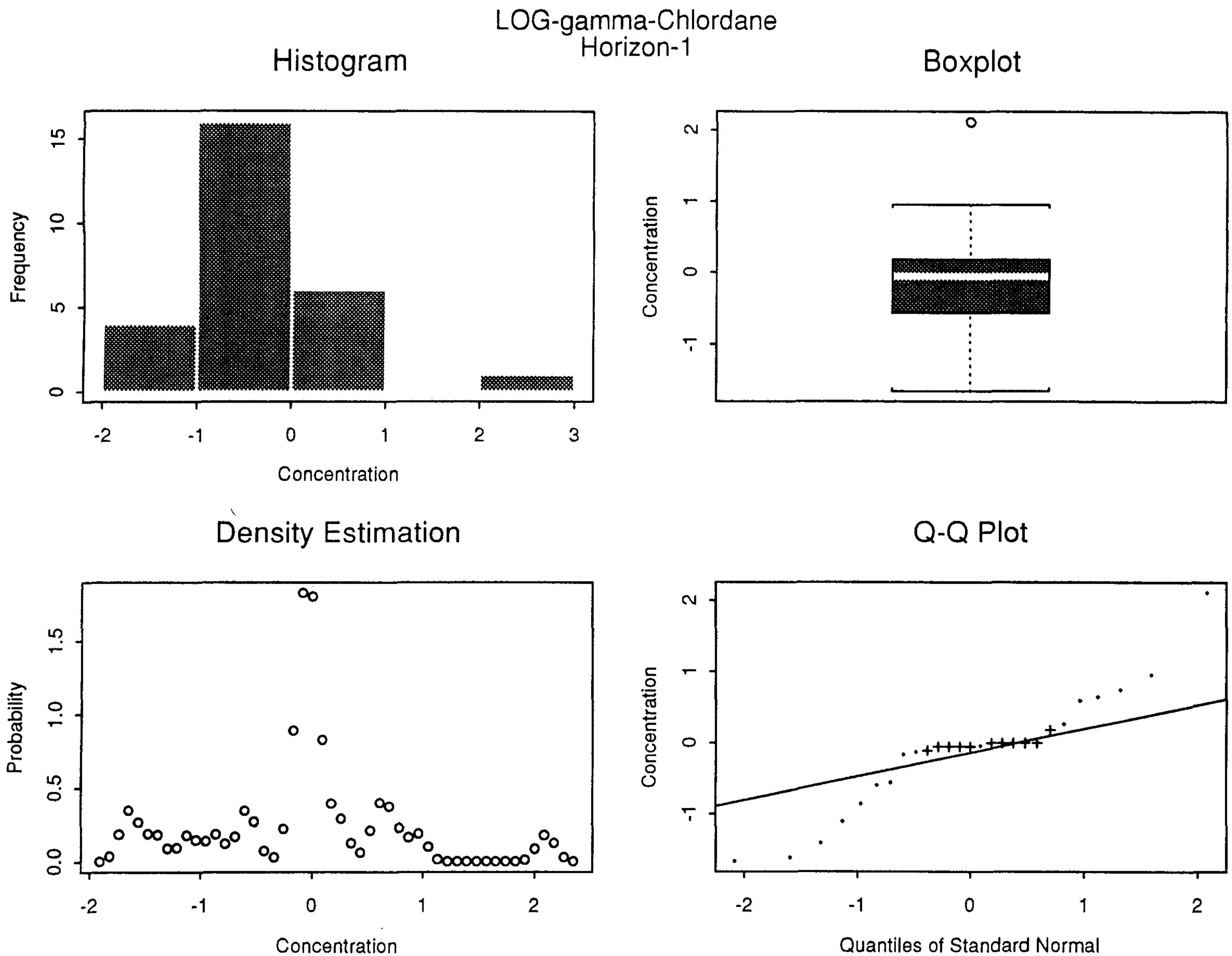


LOG-4,4'-DDE
Horizon-2



LOG-2-Methylnaphthalene
Horizon-2

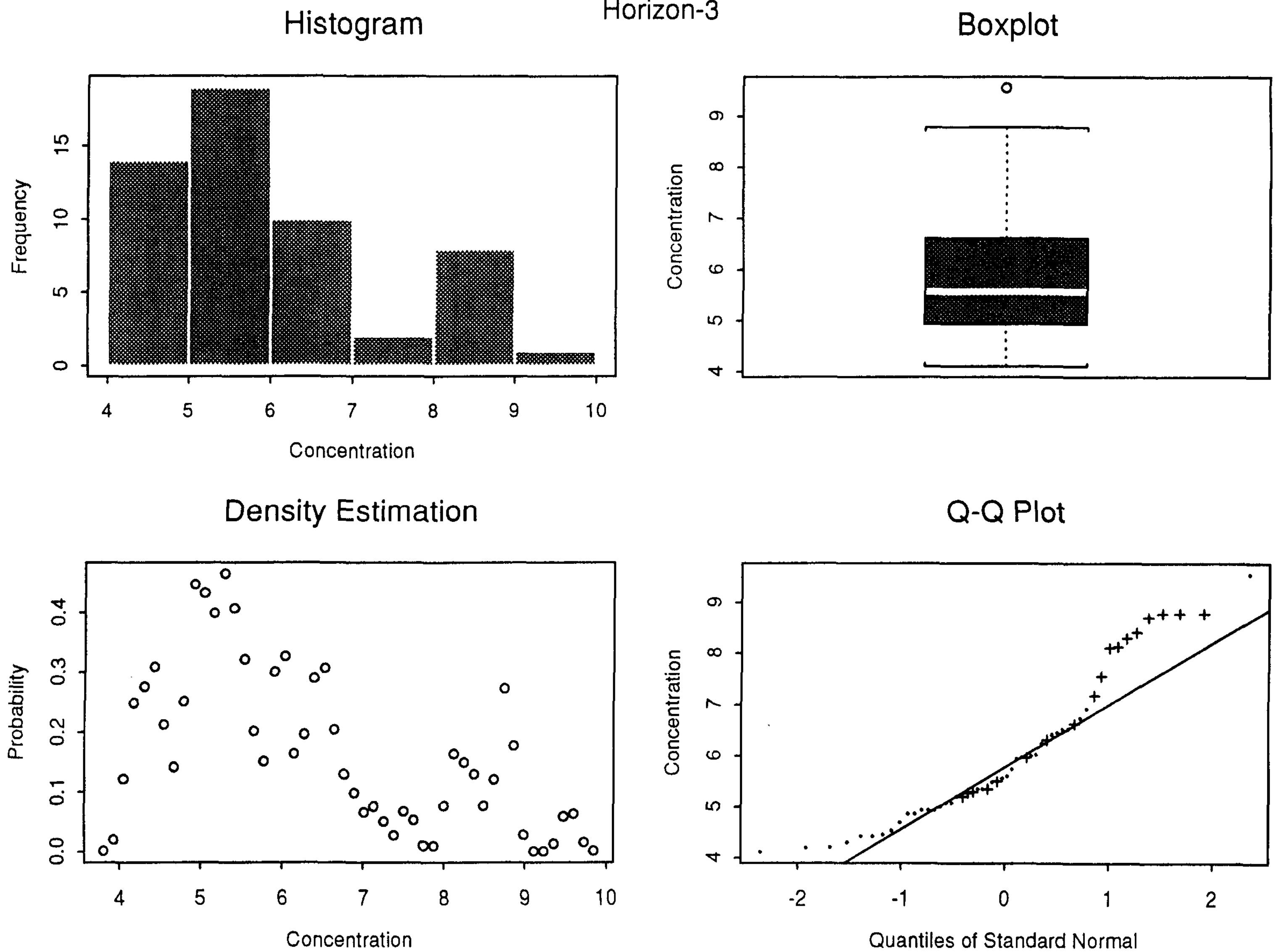



LOG-gamma-Chlordane
Horizon-1
Histogram
Frequency
0
5
10
15
-2
-1
0
1
2
3
Concentration
Boxplot
Concentration
-1
0
1
2
Density Estimation
Probability
0.0
0.5
1.0
1.5
-2
-1
0
1
2
Concentration
Q-Q Plot
Concentration
-1
0
1
2
-2
-1
0
1
2
Quantiles of Standard Normal

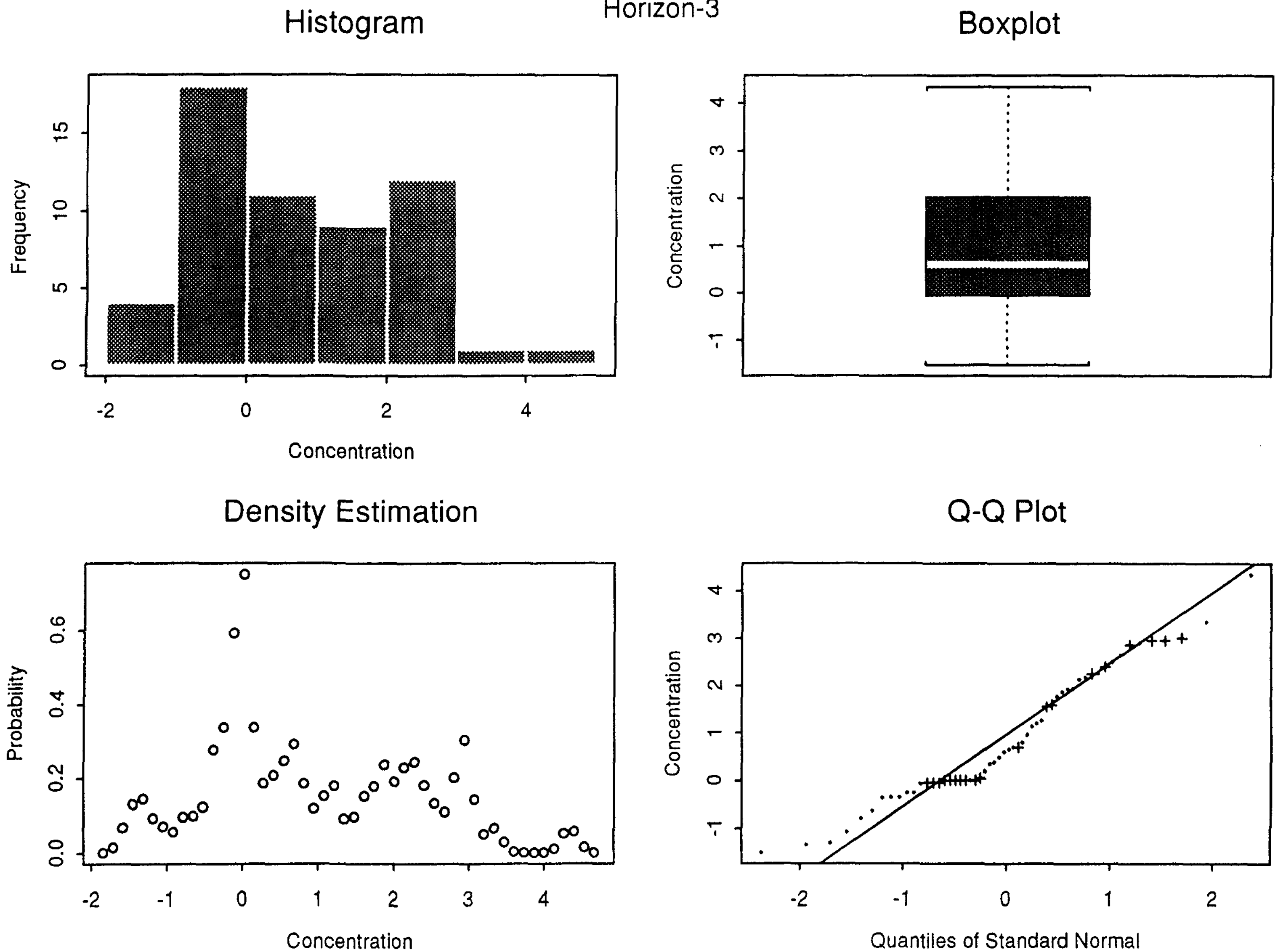
APPENDIX A.4

PLOTS FOR HORIZON 3
(0 - 20 FEET)

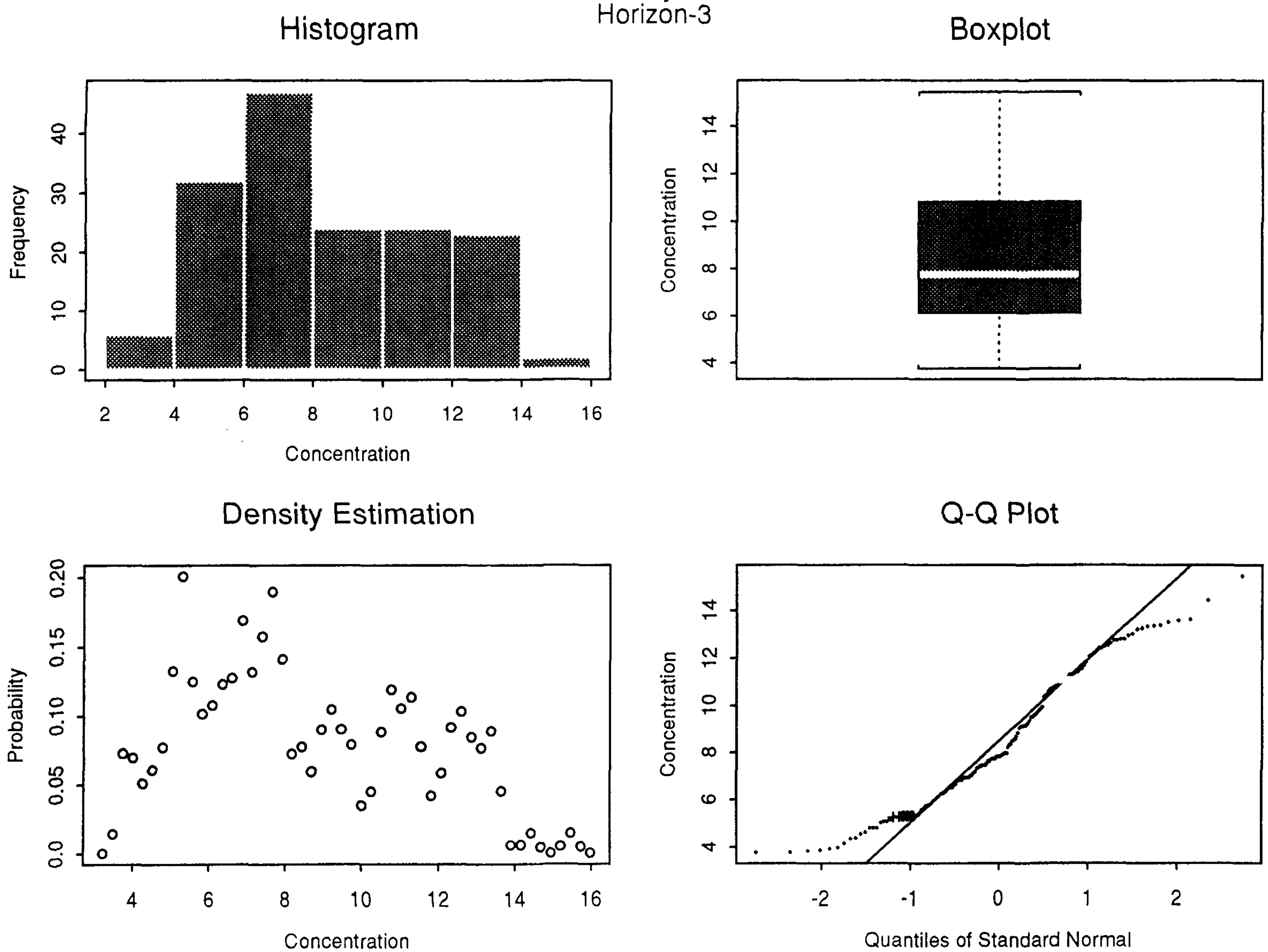
LOG-bis(2-ethylhexyl)Phthalate
Horizon-3



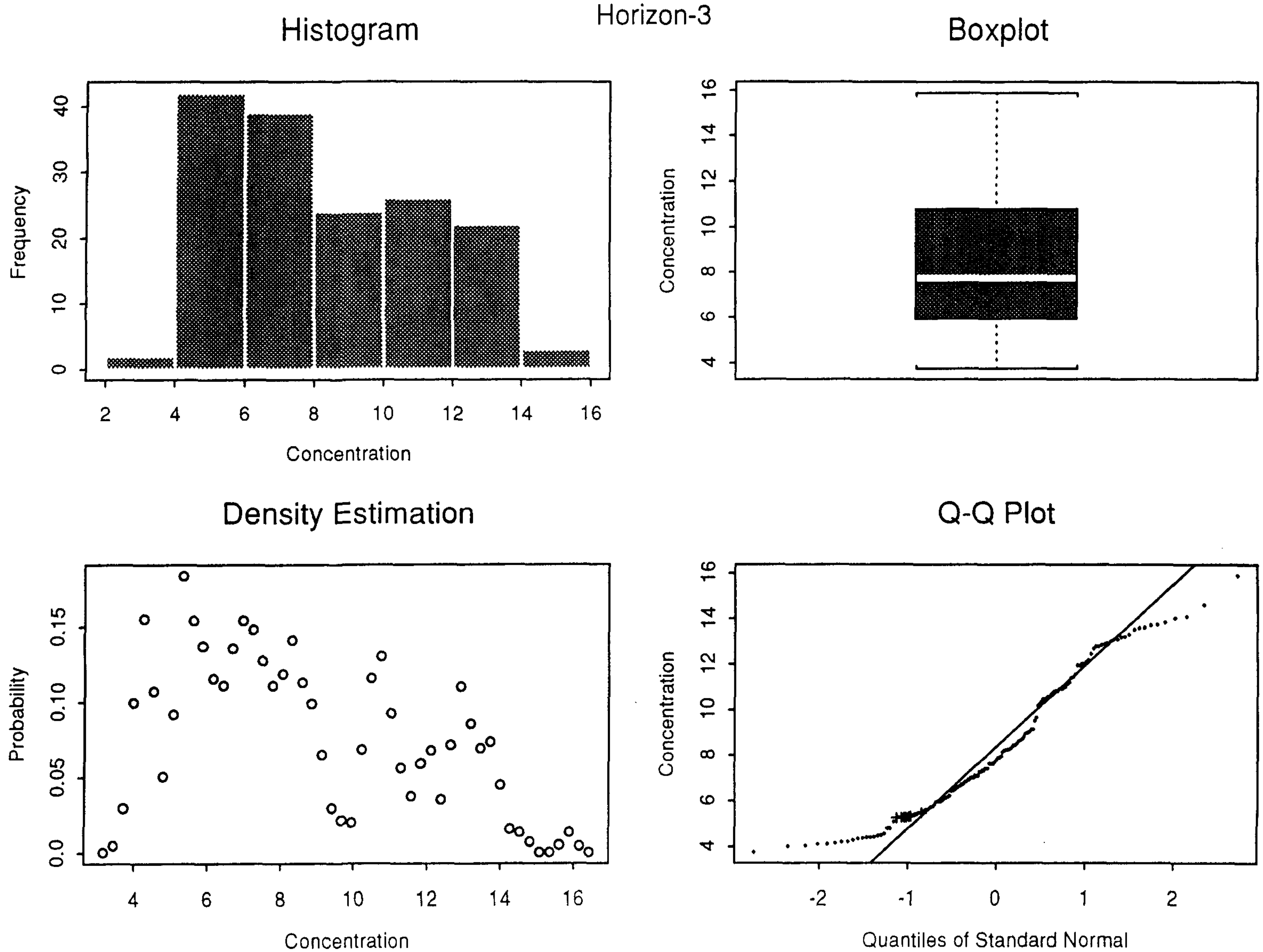
LOG-alpha-Chlordane
Horizon-3



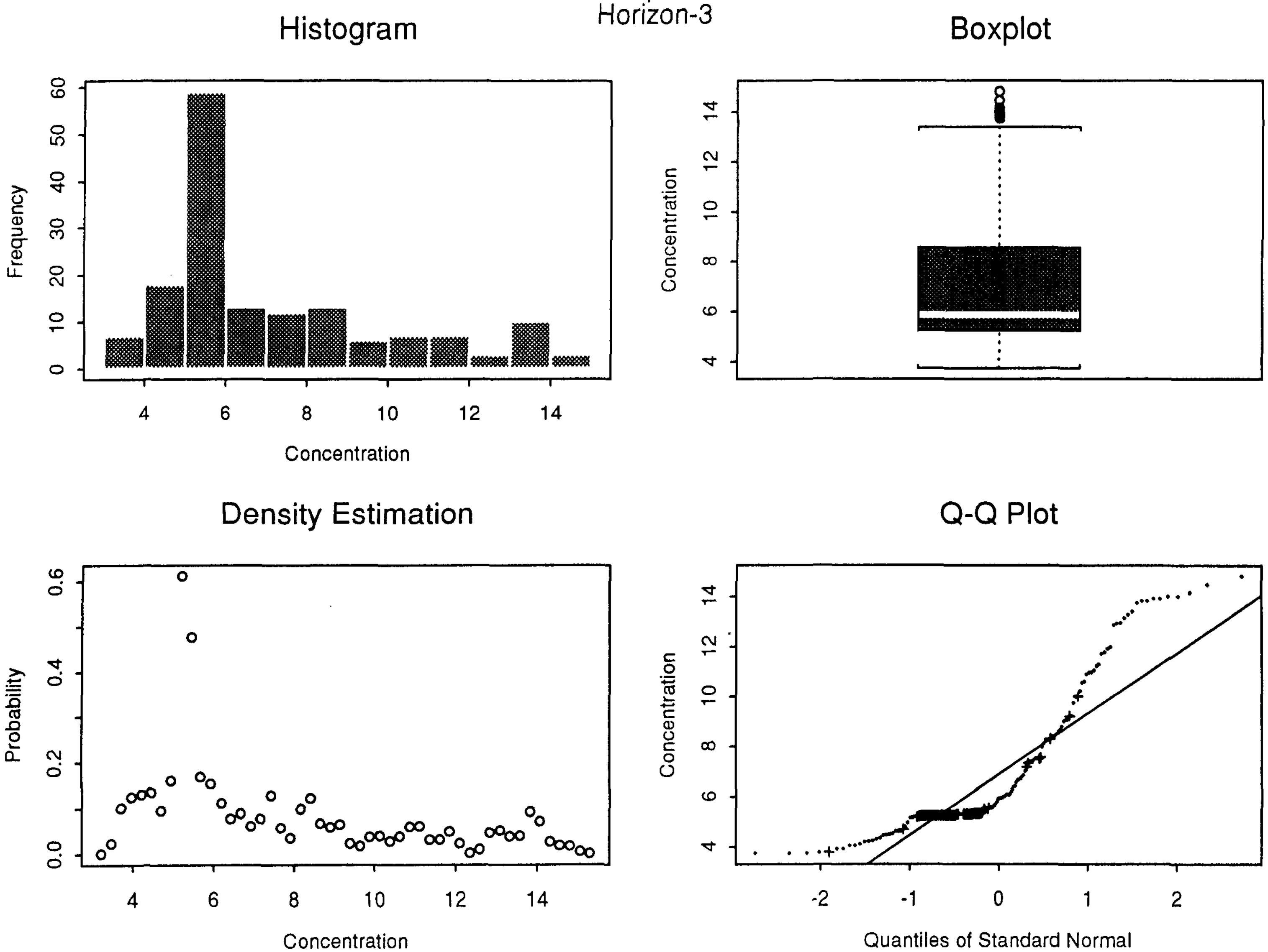
LOG-Pyrene
Horizon-3



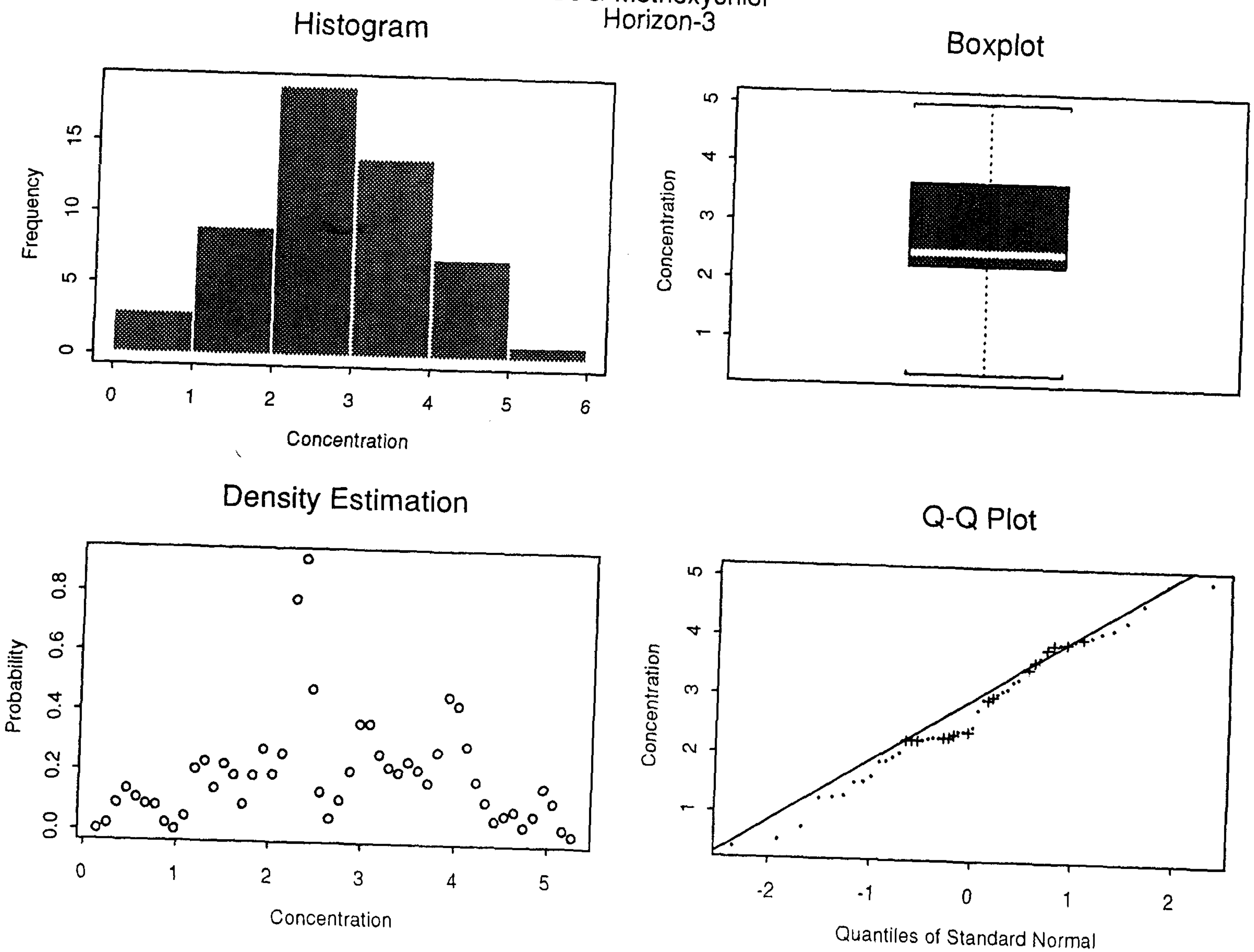
LOG-Phenanthrene
Horizon-3

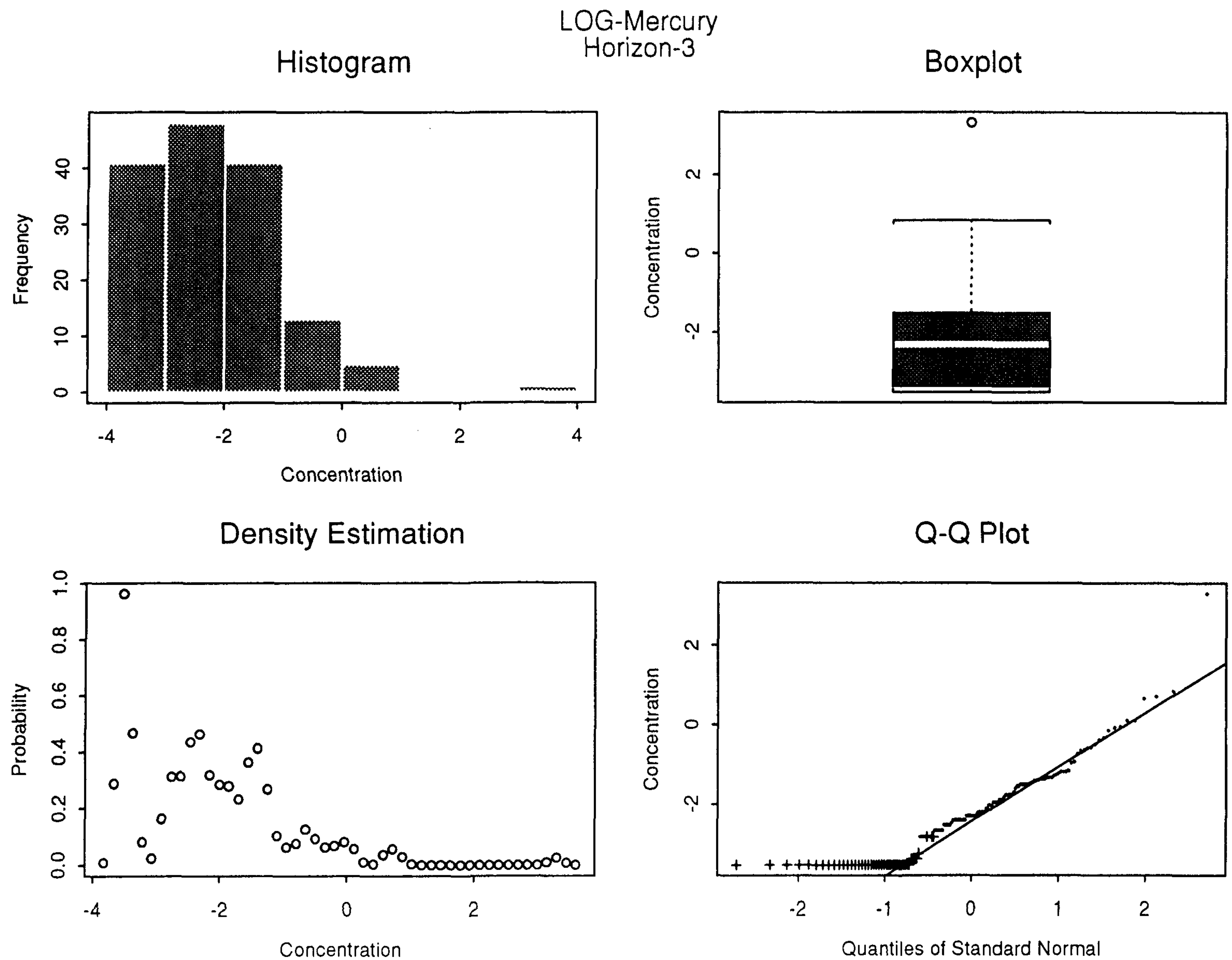


LOG-Naphthalene
Horizon-3

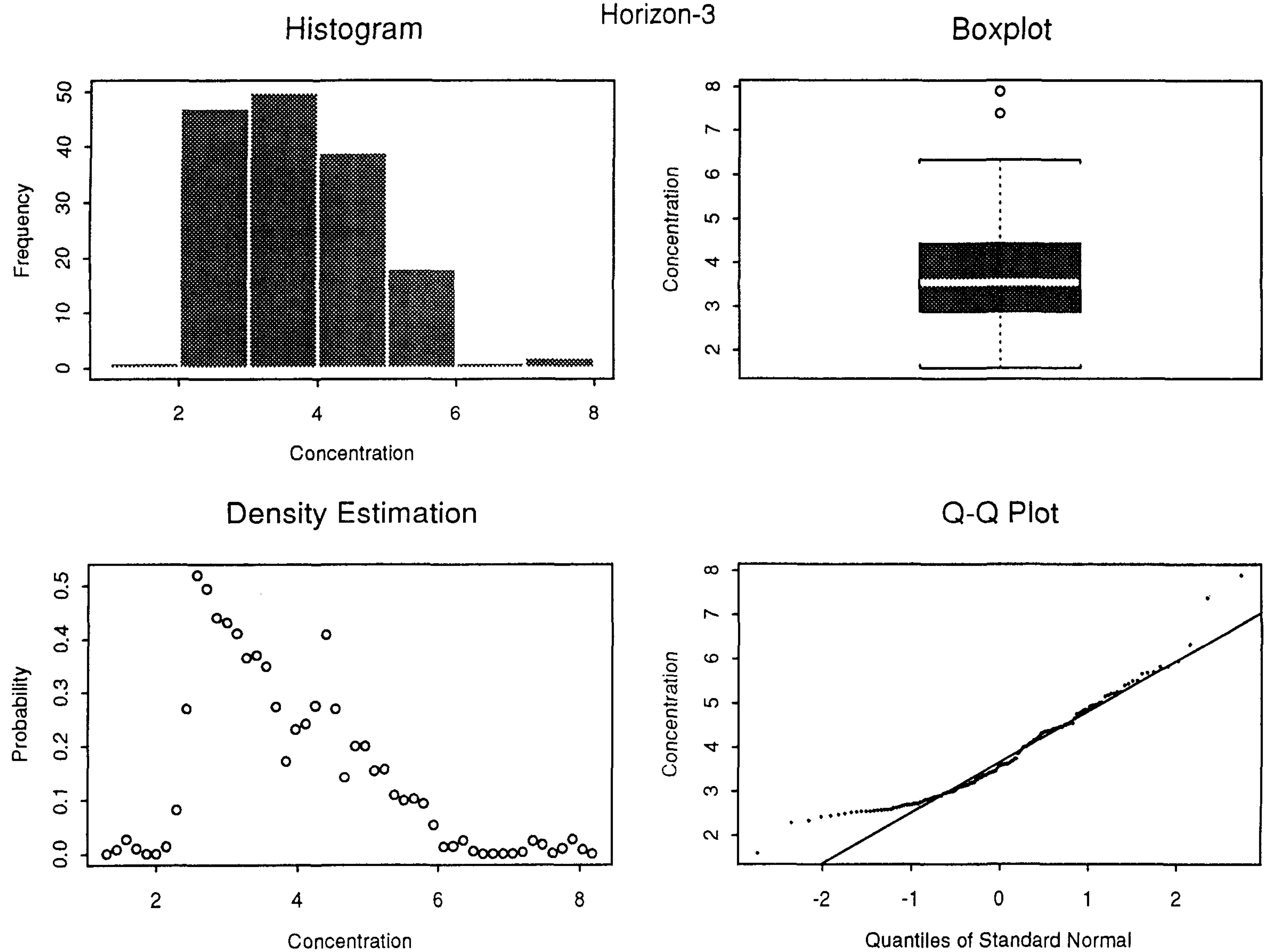


LOG-Methoxychlor
Horizon-3

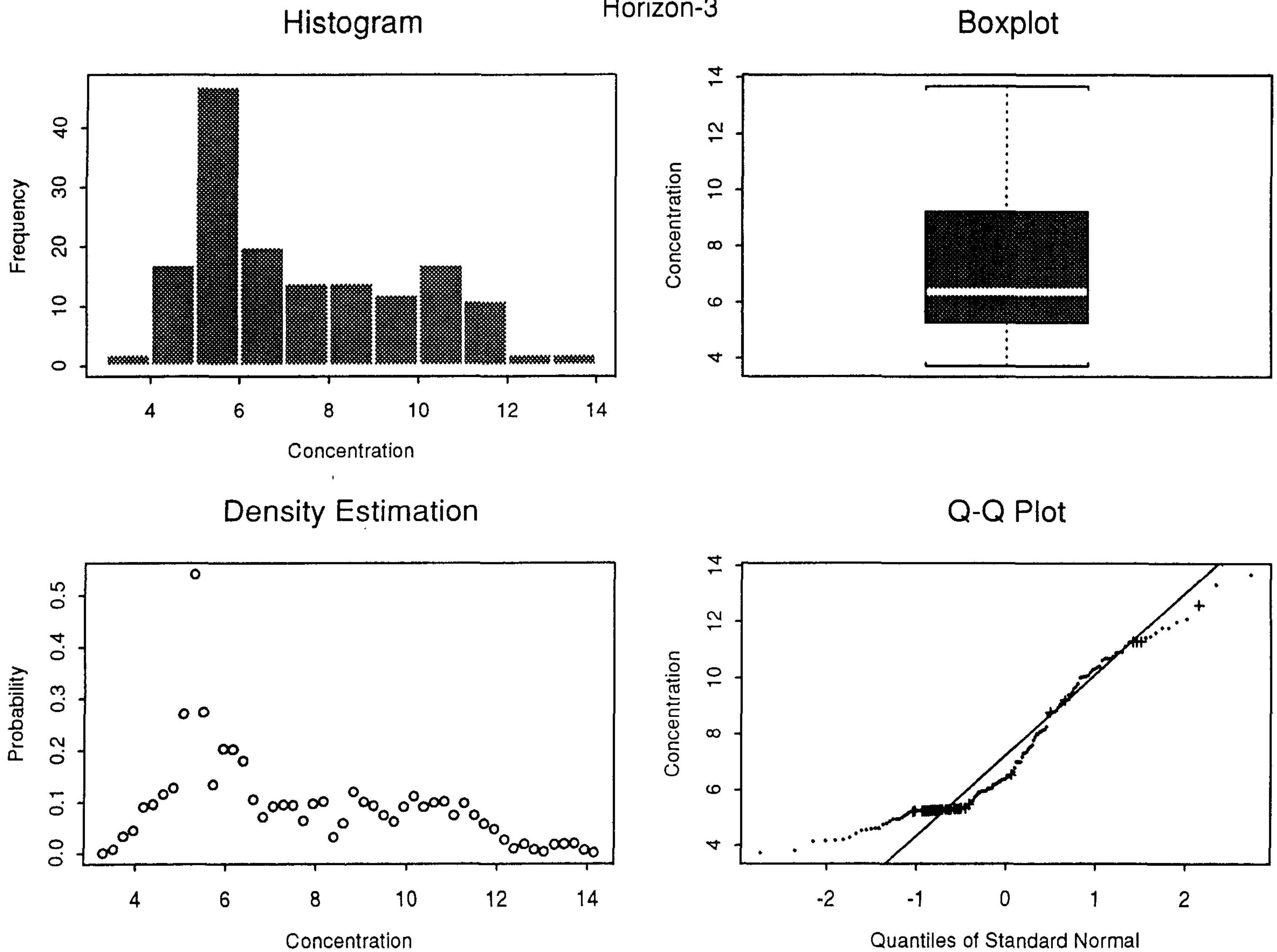



LOG-Mercury
Horizon-3
Histogram
Frequency
0
10
20
30
40
-4
-2
0
2
4
Concentration
Boxplot
Concentration
-2
0
2
Density Estimation
Probability
0.0
0.2
0.4
0.6
0.8
1.0
-4
-2
0
2
Concentration
Q-Q Plot
Concentration
-2
0
2
-2
-1
0
1
2
Quantiles of Standard Normal

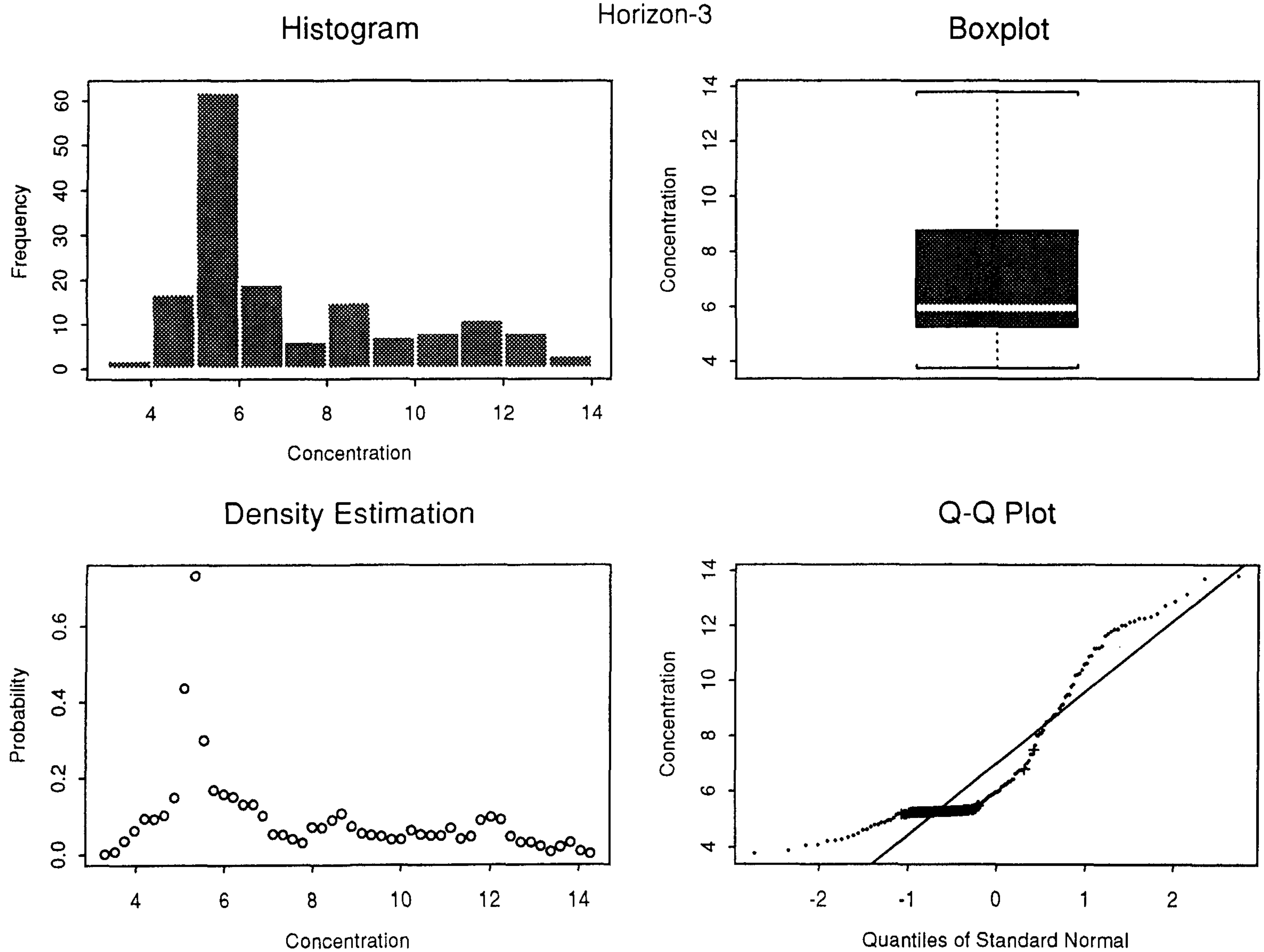
LOG-Lead
Horizon-3

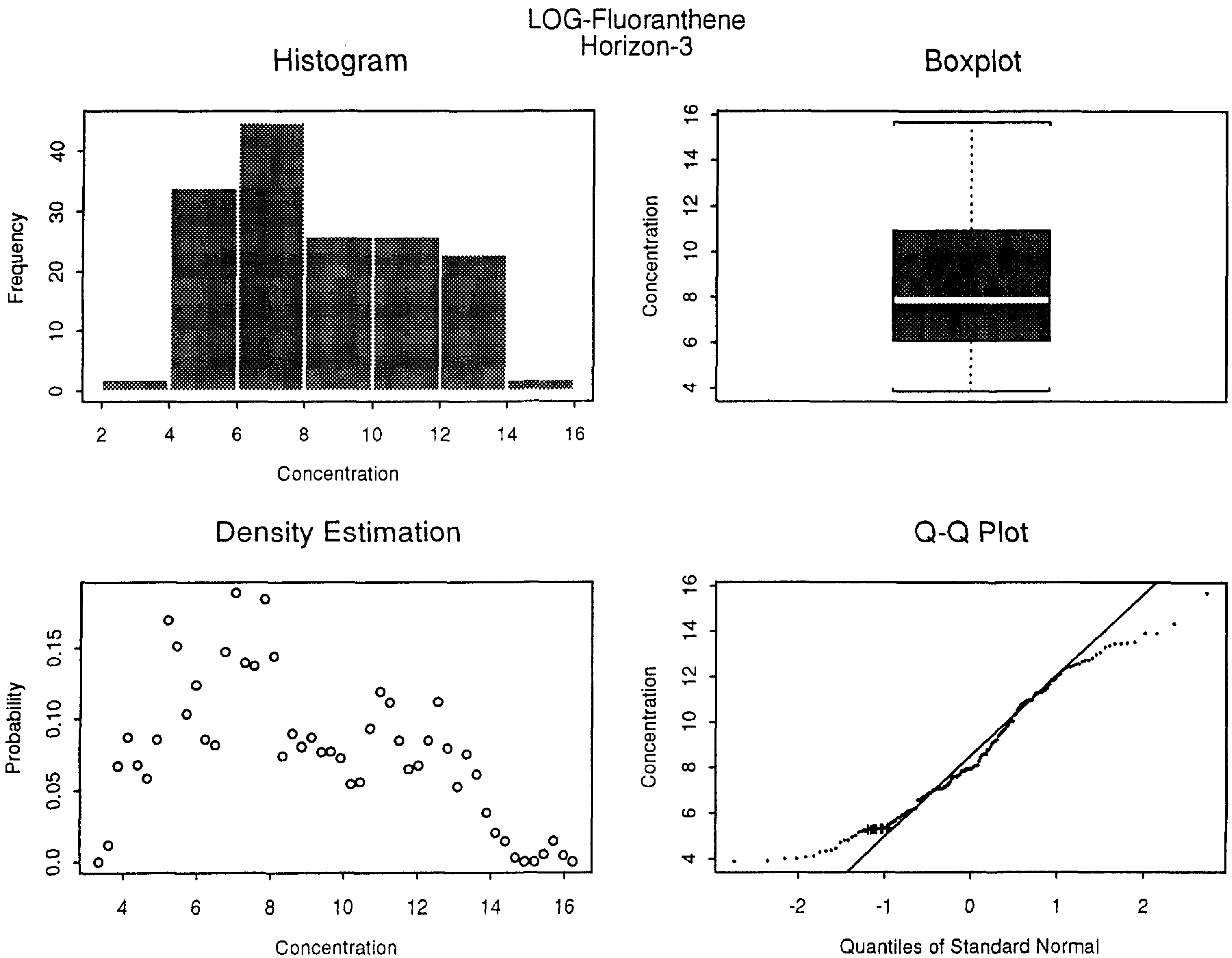


LOG-Indeno(1,2,3-cd)pyrene
Horizon-3

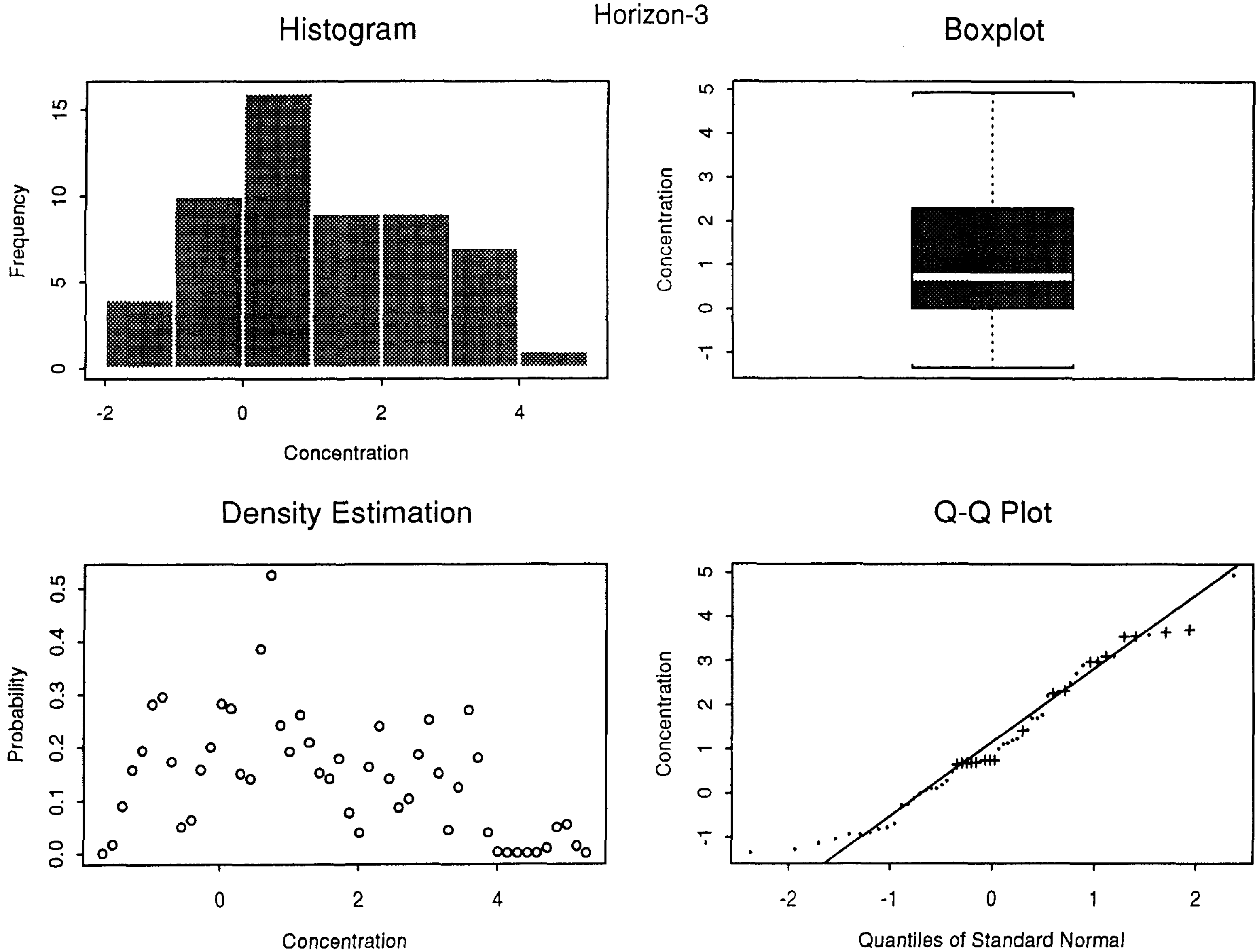


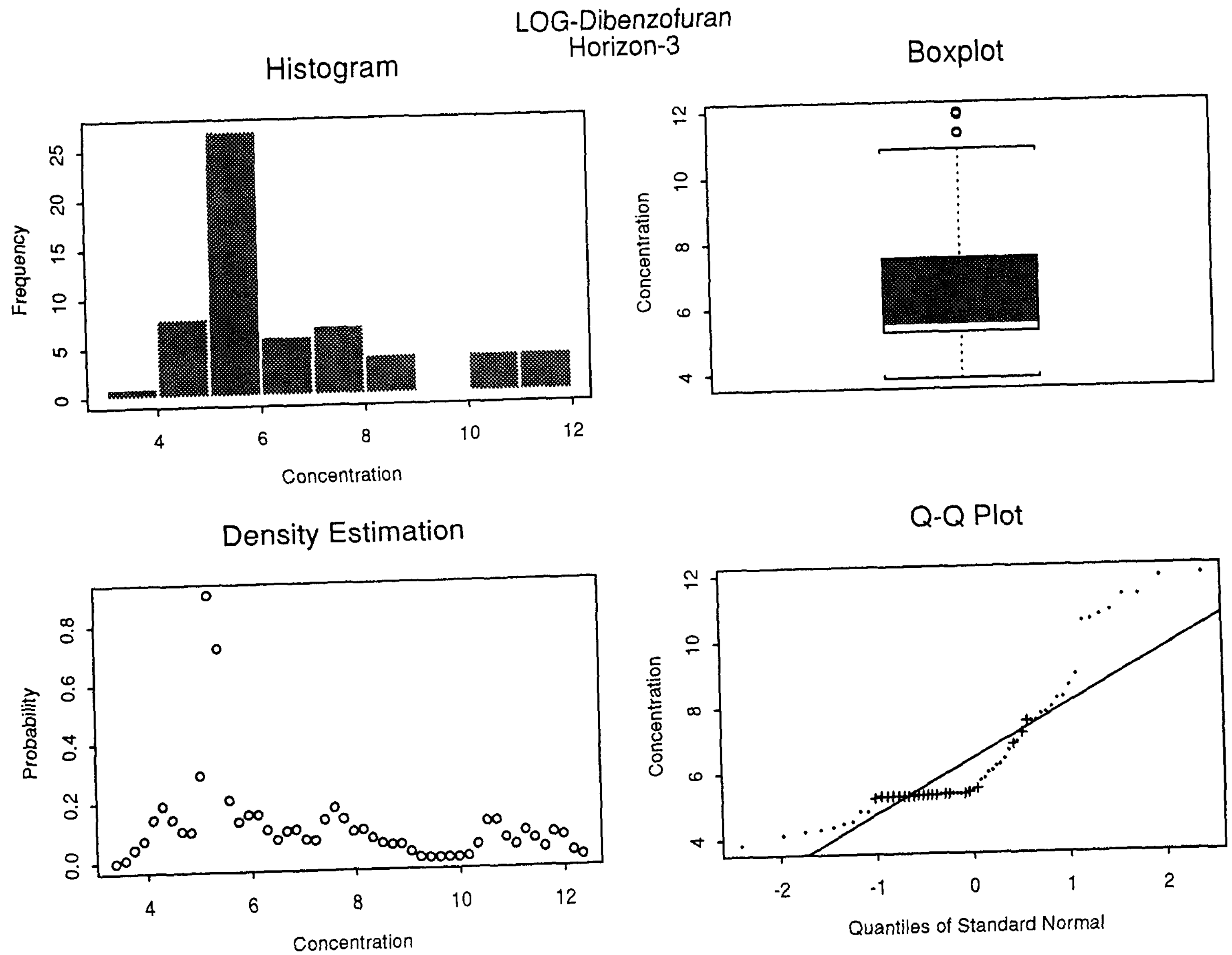
LOG-Fluorene
Horizon-3



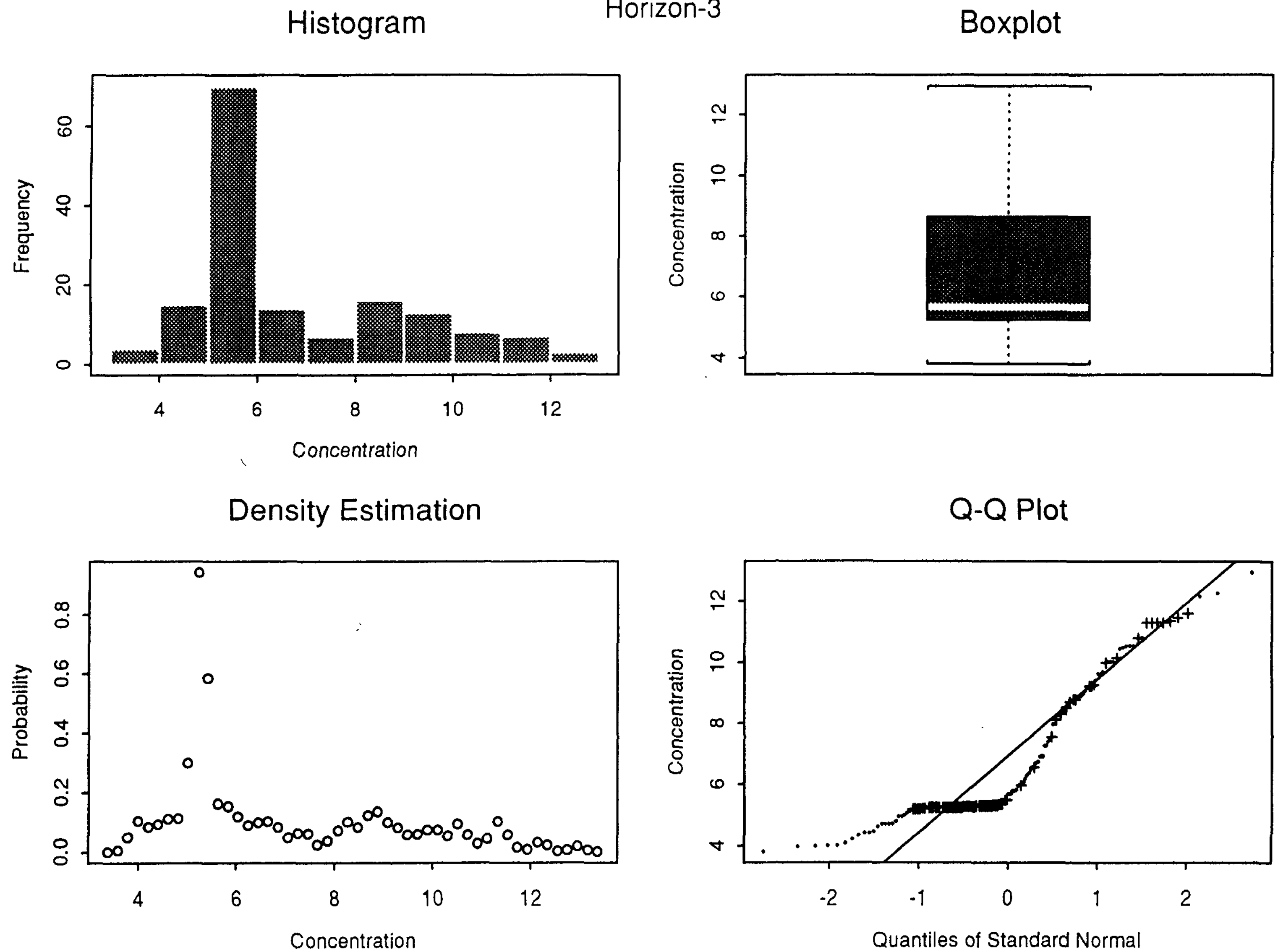

LOG-Fluoranthene
Horizon-3
Histogram
Frequency
0
10
20
30
40
2
4
6
8
10
12
14
16
Concentration
Boxplot
Concentration
4
6
8
10
12
14
16
Density Estimation
Probability
0.0
0.05
0.10
0.15
4
6
8
10
12
14
16
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
14
16
-2
-1
0
1
2
Quantiles of Standard Normal

LOG-Dieldrin
Horizon-3

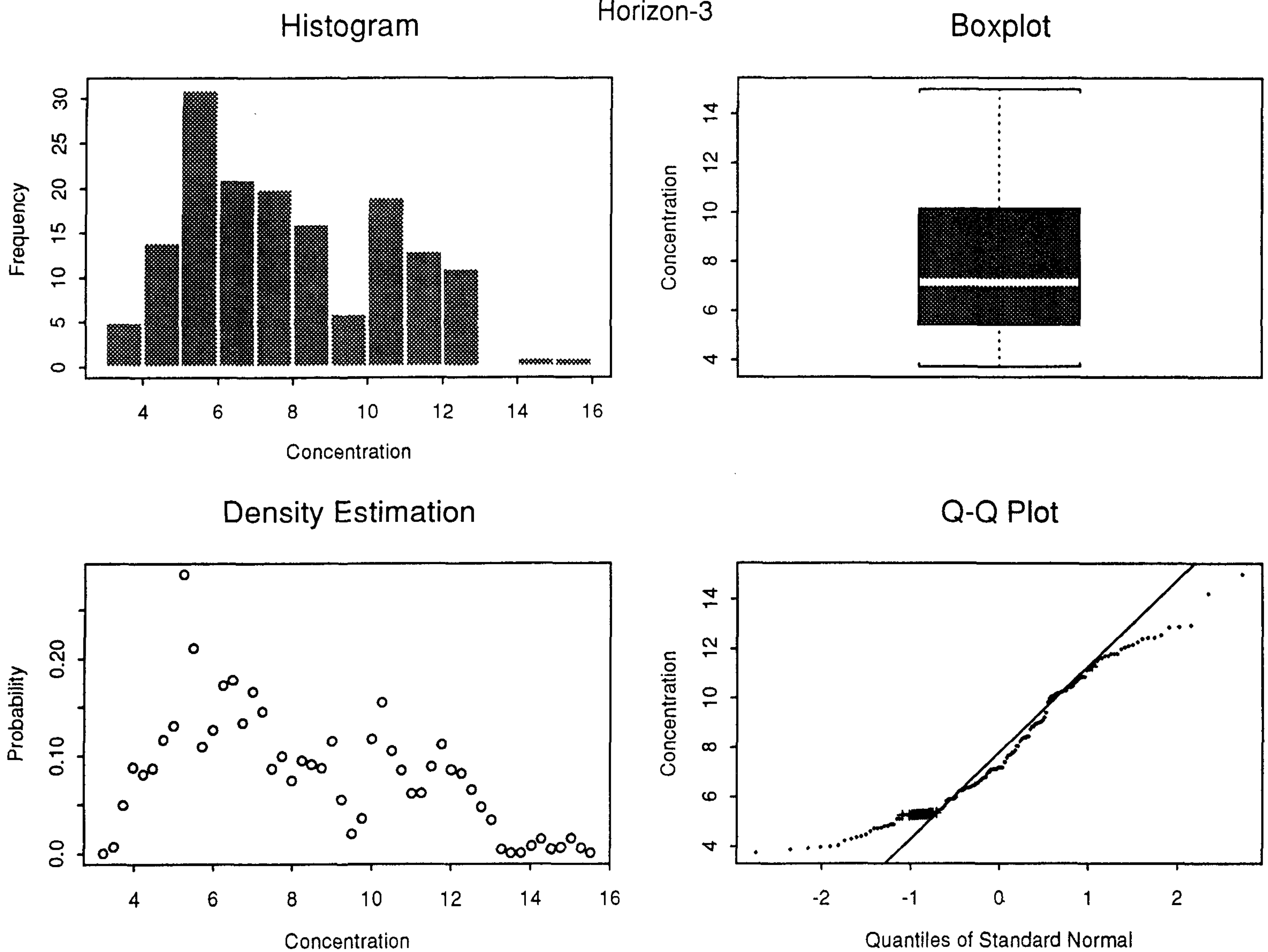



LOG-Dibenzofuran
Horizon-3
Histogram
Frequency
0
5
10
15
20
25
4
6
8
10
12
Concentration
Boxplot
Concentration
4
6
8
10
12
Density Estimation
Probability
0.0
0.2
0.4
0.6
0.8
4
6
8
10
12
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
-2
-1
0
1
2
Quantiles of Standard Normal

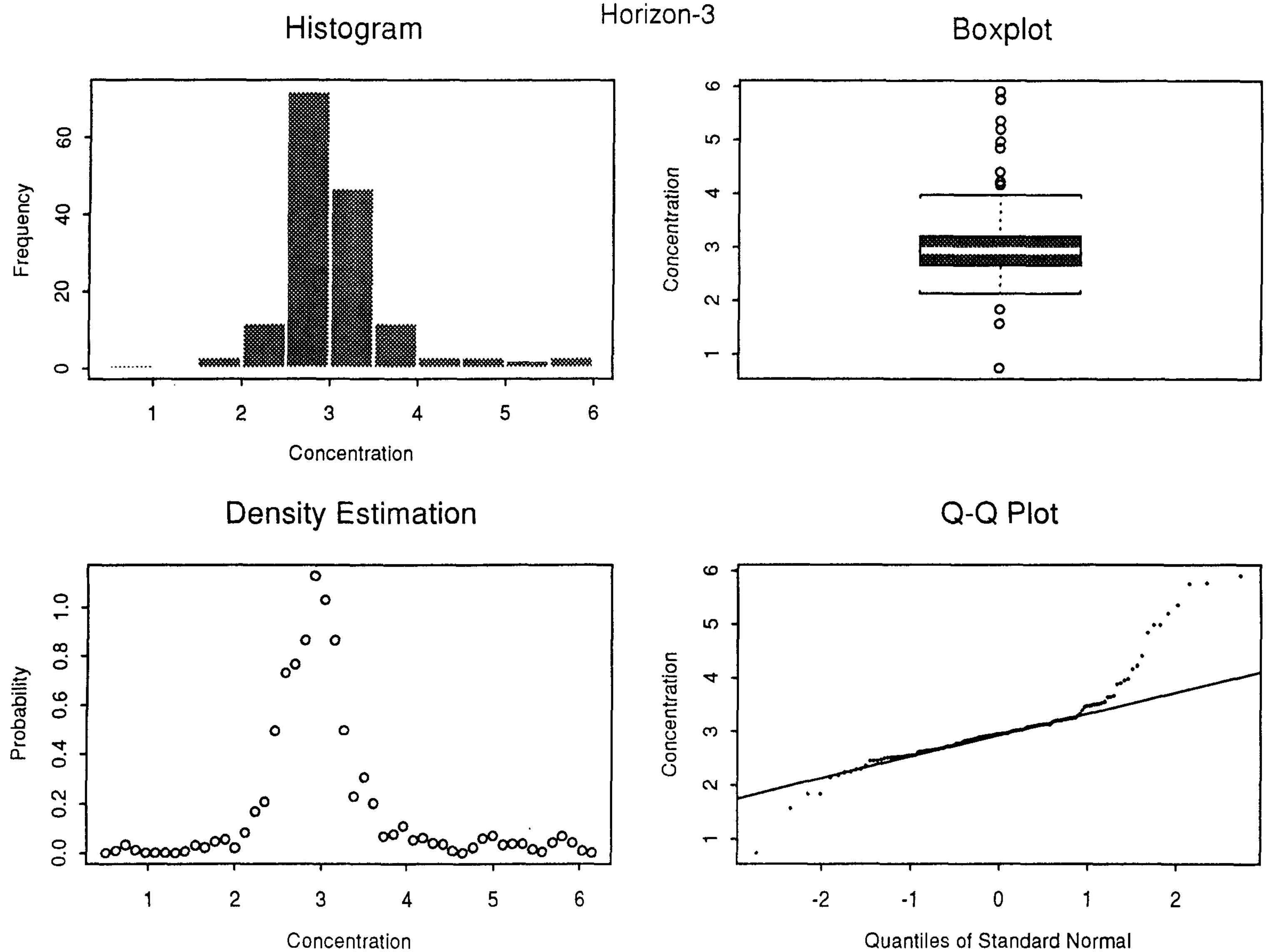
LOG-Dibenz(a,h)anthracene
Horizon-3

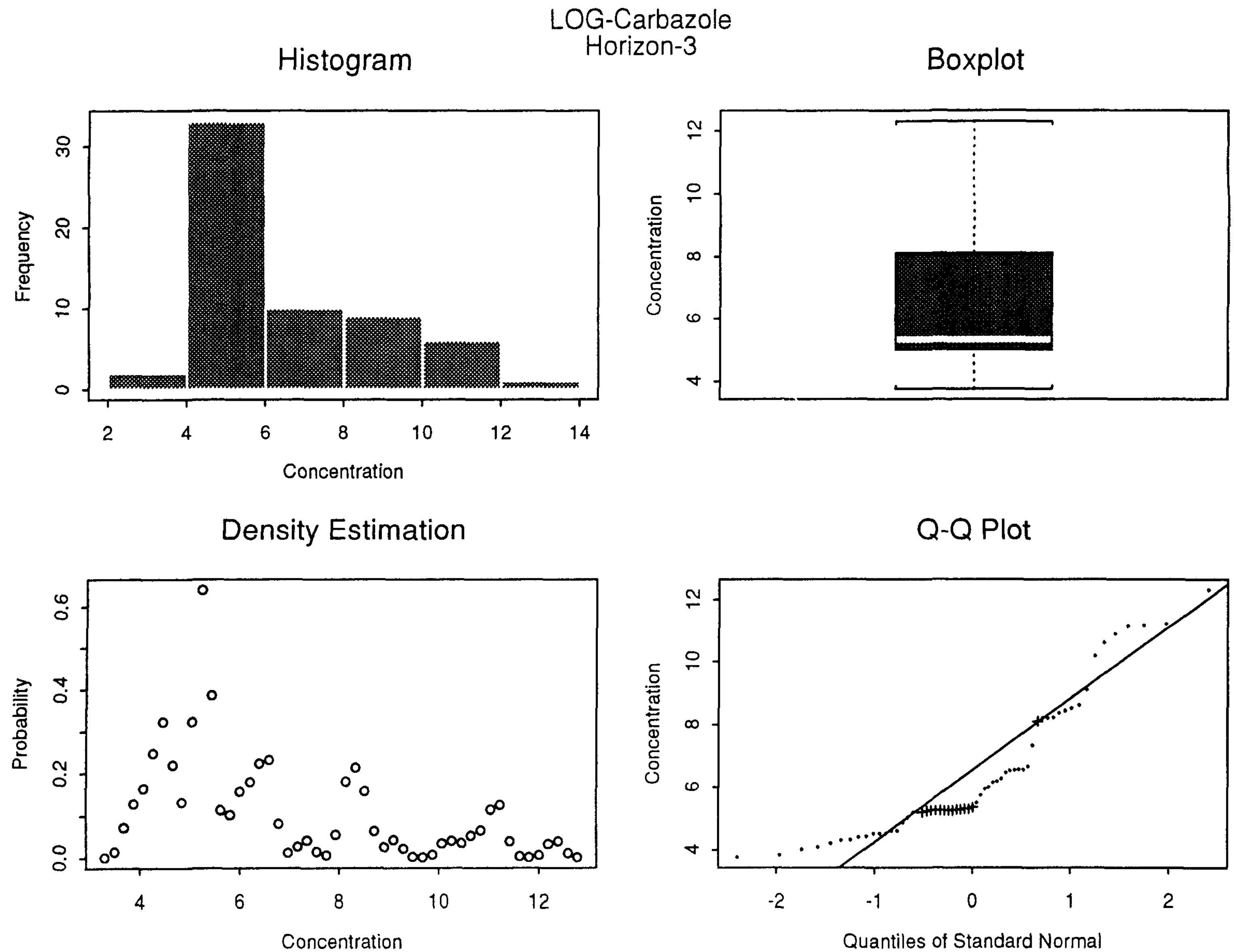


LOG-Chrysene
Horizon-3

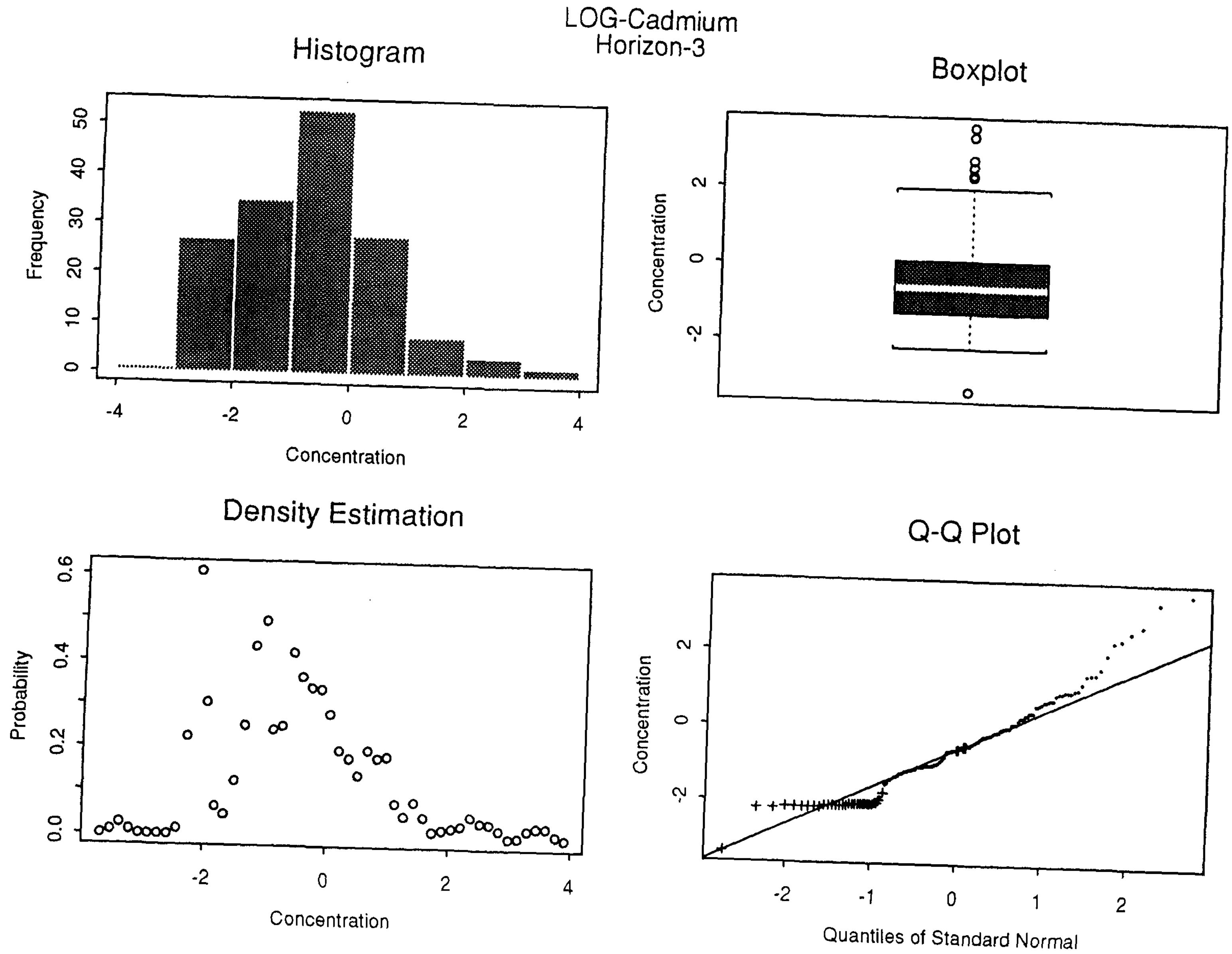


LOG-Chromium
Horizon-3

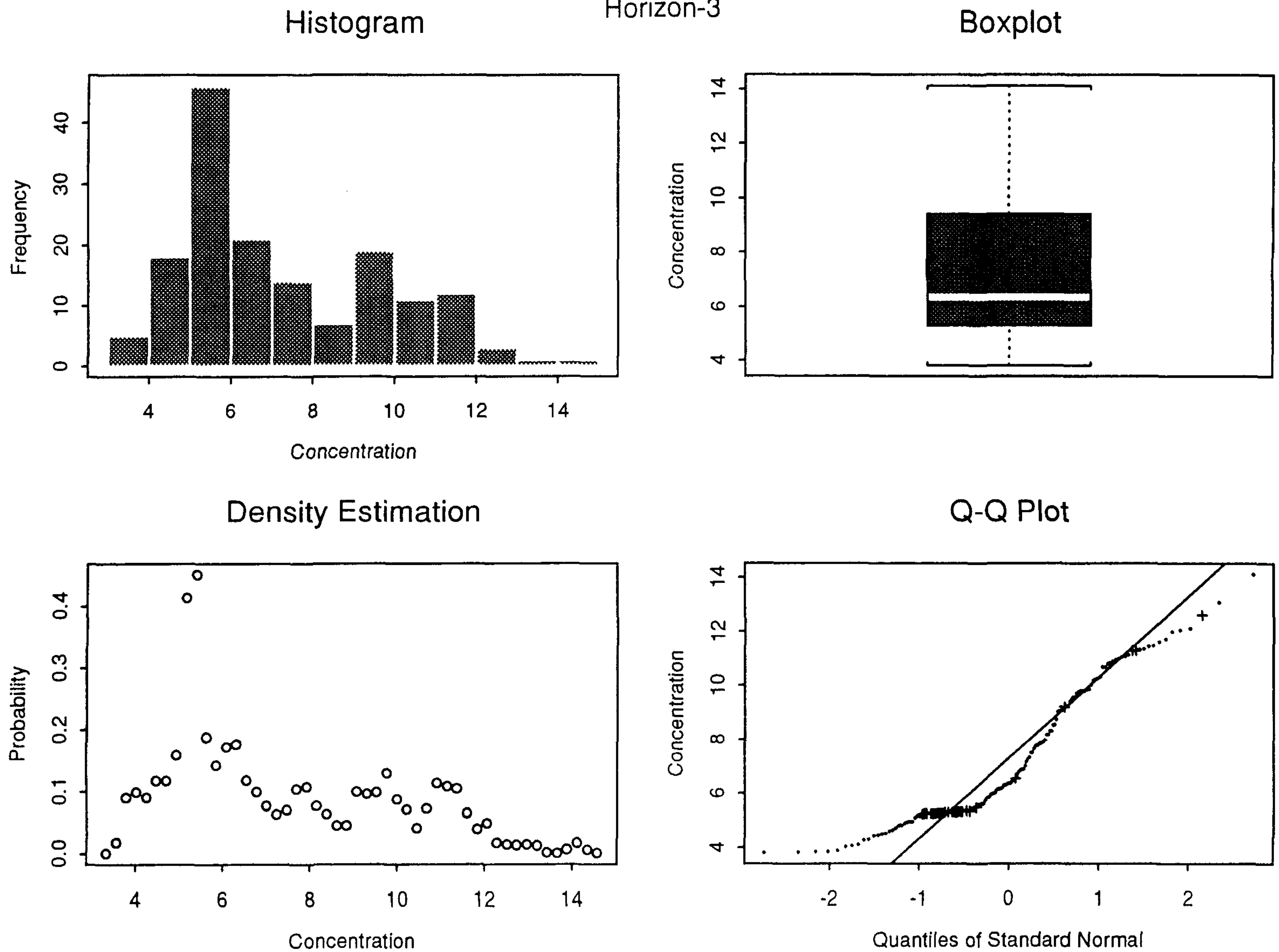




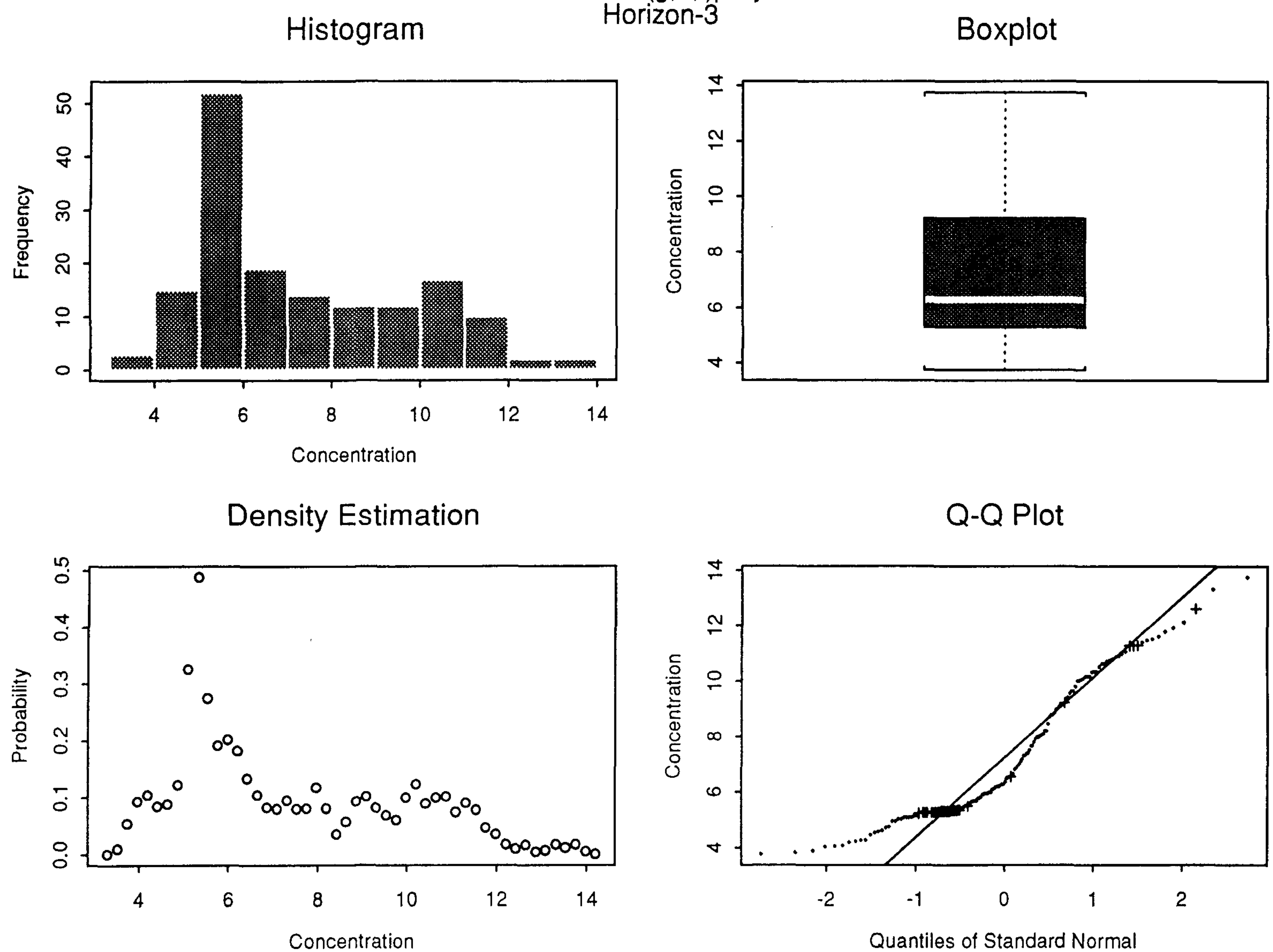
LOG-Carbazole
Horizon-3
Histogram
Frequency
0
10
20
30
2
4
6
8
10
12
14
Concentration
Boxplot
Concentration
4
6
8
10
12
Density Estimation
Probability
0.0
0.2
0.4
0.6
4
6
8
10
12
Concentration
Q-Q Plot
Concentration
4
6
8
10
12
-2
-1
0
1
2
Quantiles of Standard Normal


LOG-Cadmium
Horizon-3
Histogram
Frequency
0
10
20
30
40
50
-4
-2
0
2
4
Concentration
Boxplot
Concentration
-2
0
2
Density Estimation
Probability
0.0
0.2
0.4
0.6
-2
0
2
4
Concentration
Q-Q Plot
Concentration
-2
0
2
-2
-1
0
1
2
Quantiles of Standard Normal

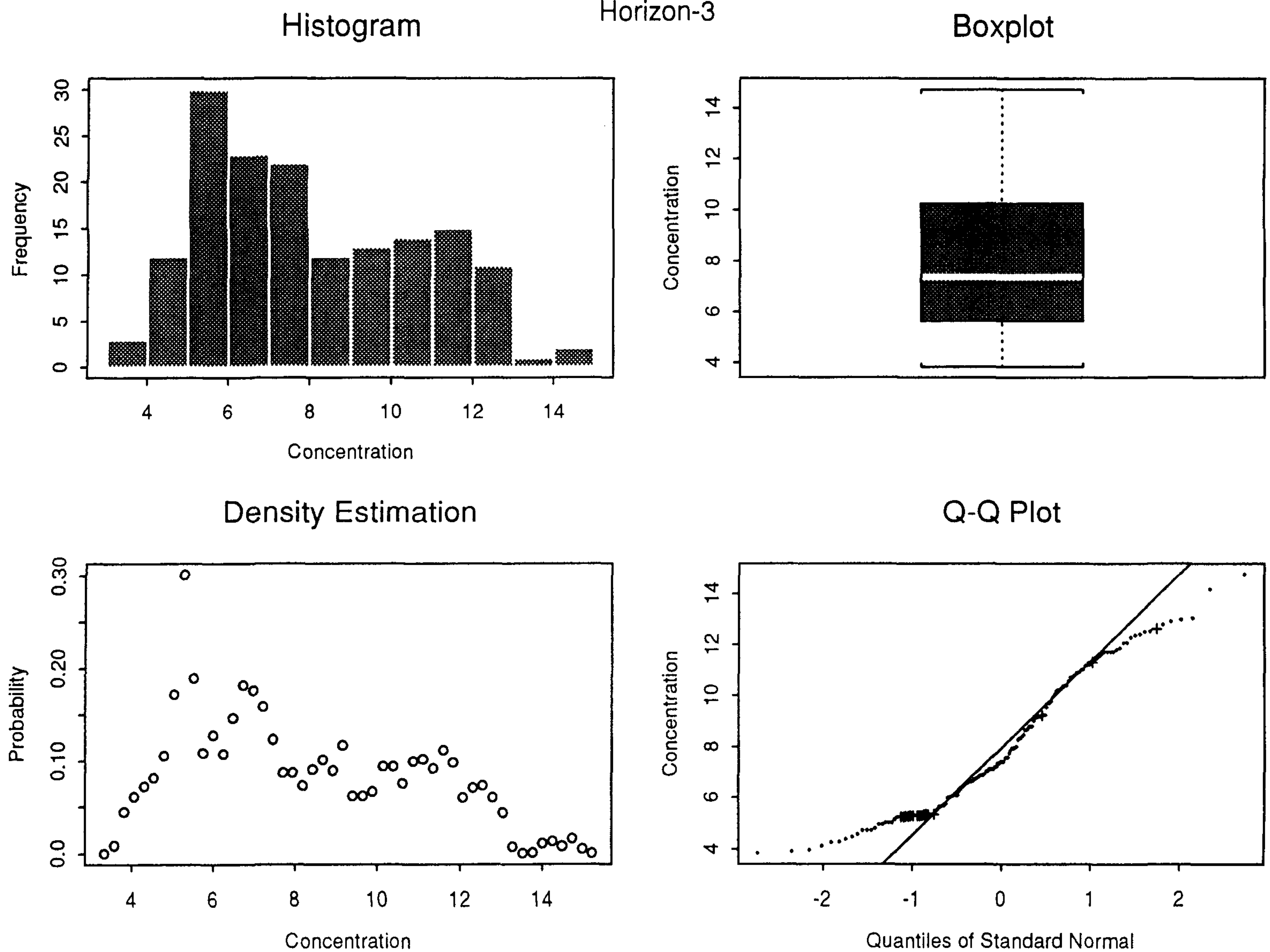
LOG-Benzo(k)fluoranthene
Horizon-3



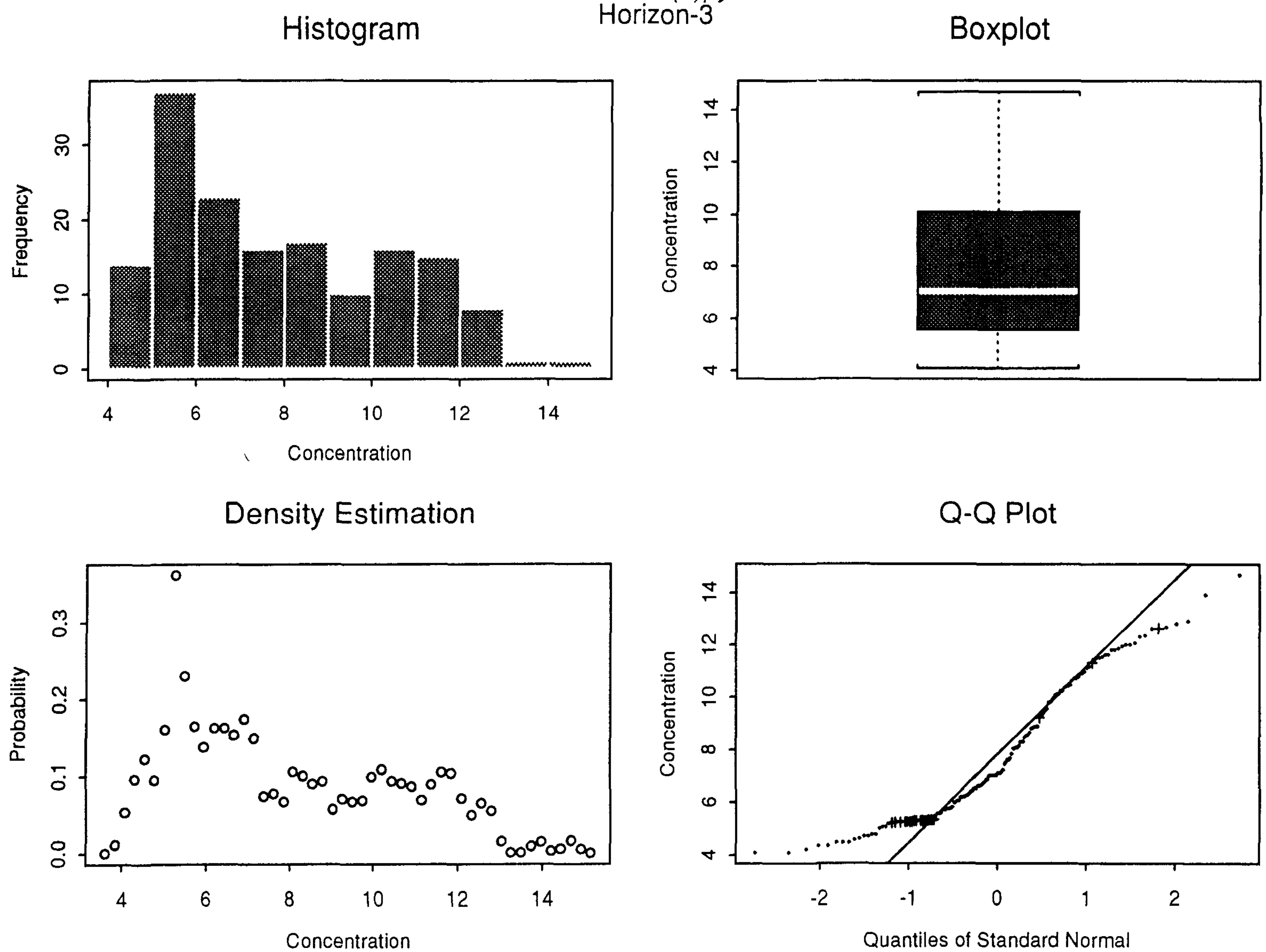
LOG-Benzo(g,h,i)perylene
Horizon-3



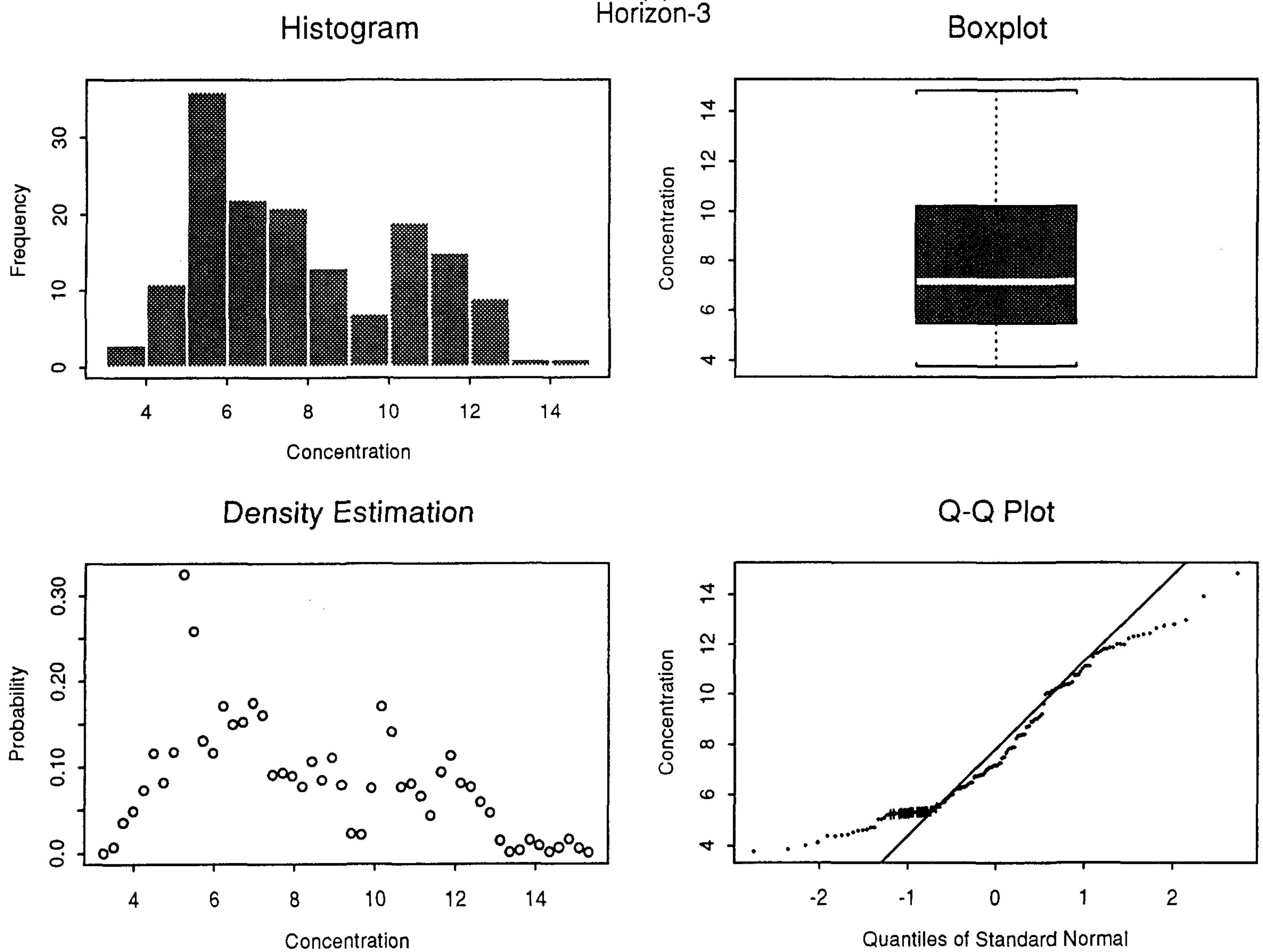
LOG-Benzo(b)fluoranthene
Horizon-3



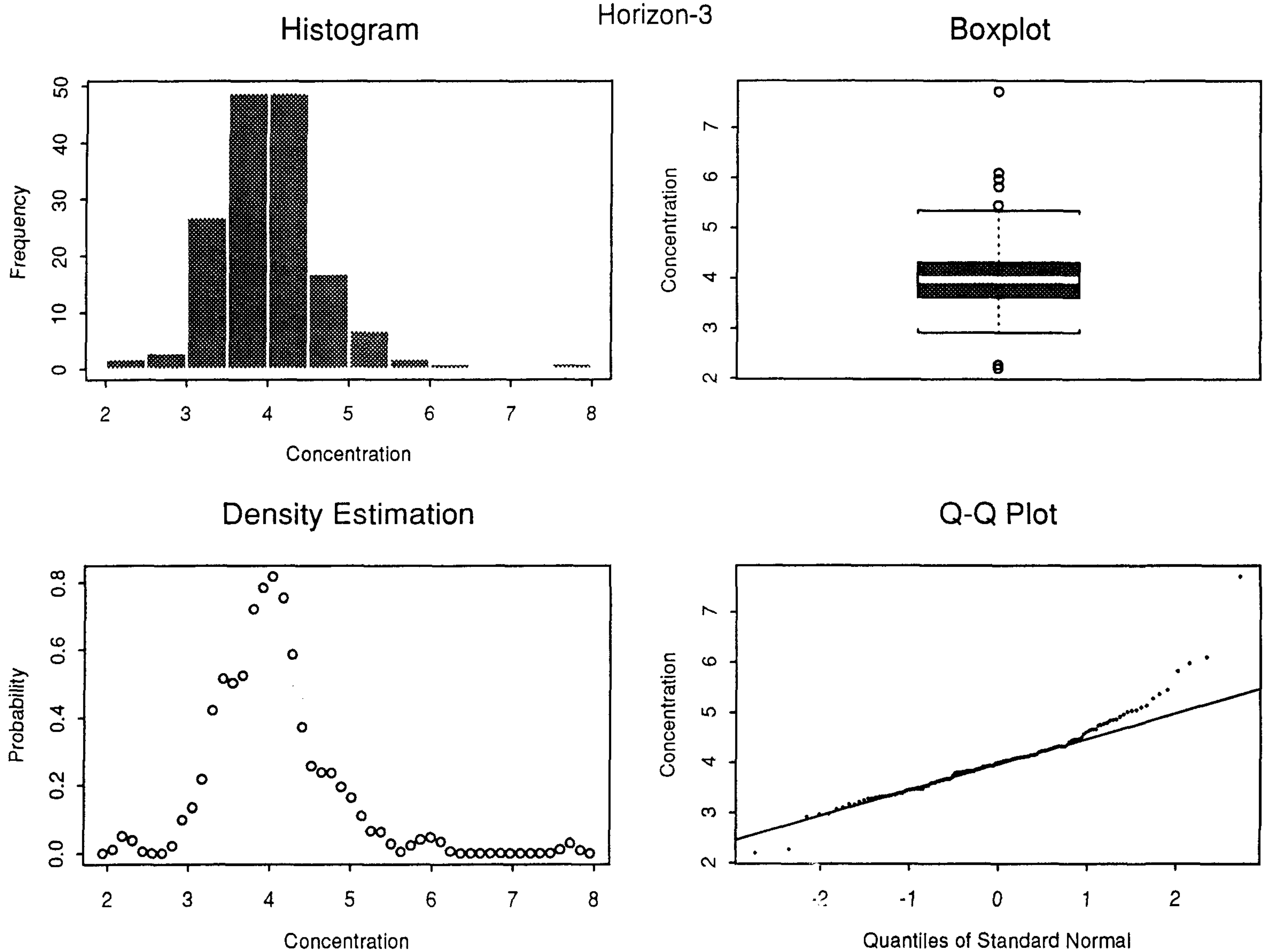
LOG-Benzo(a)pyrene
Horizon-3



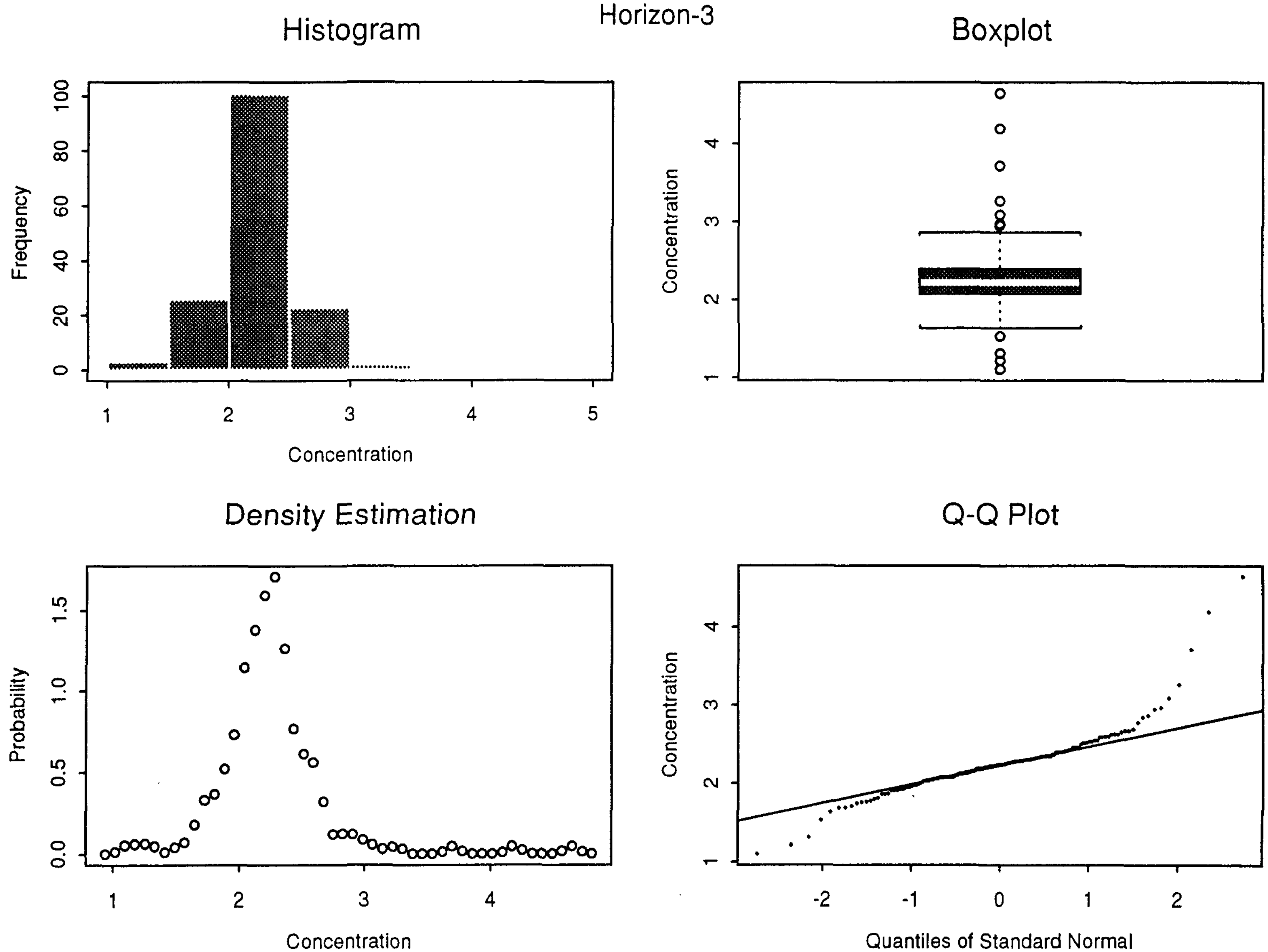
LOG-Benzo(a)Anthracene
Horizon-3



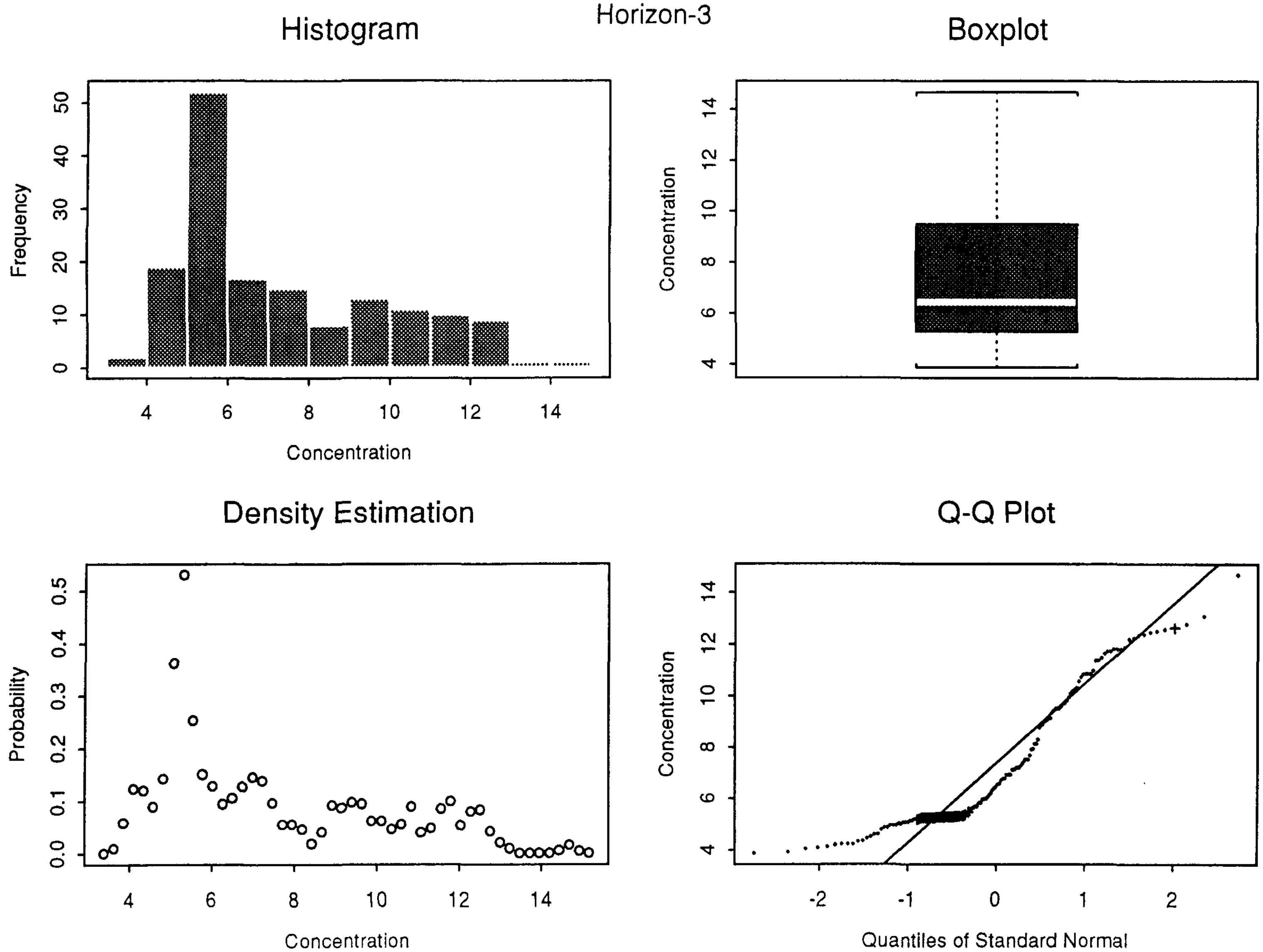
LOG-Barium
Horizon-3



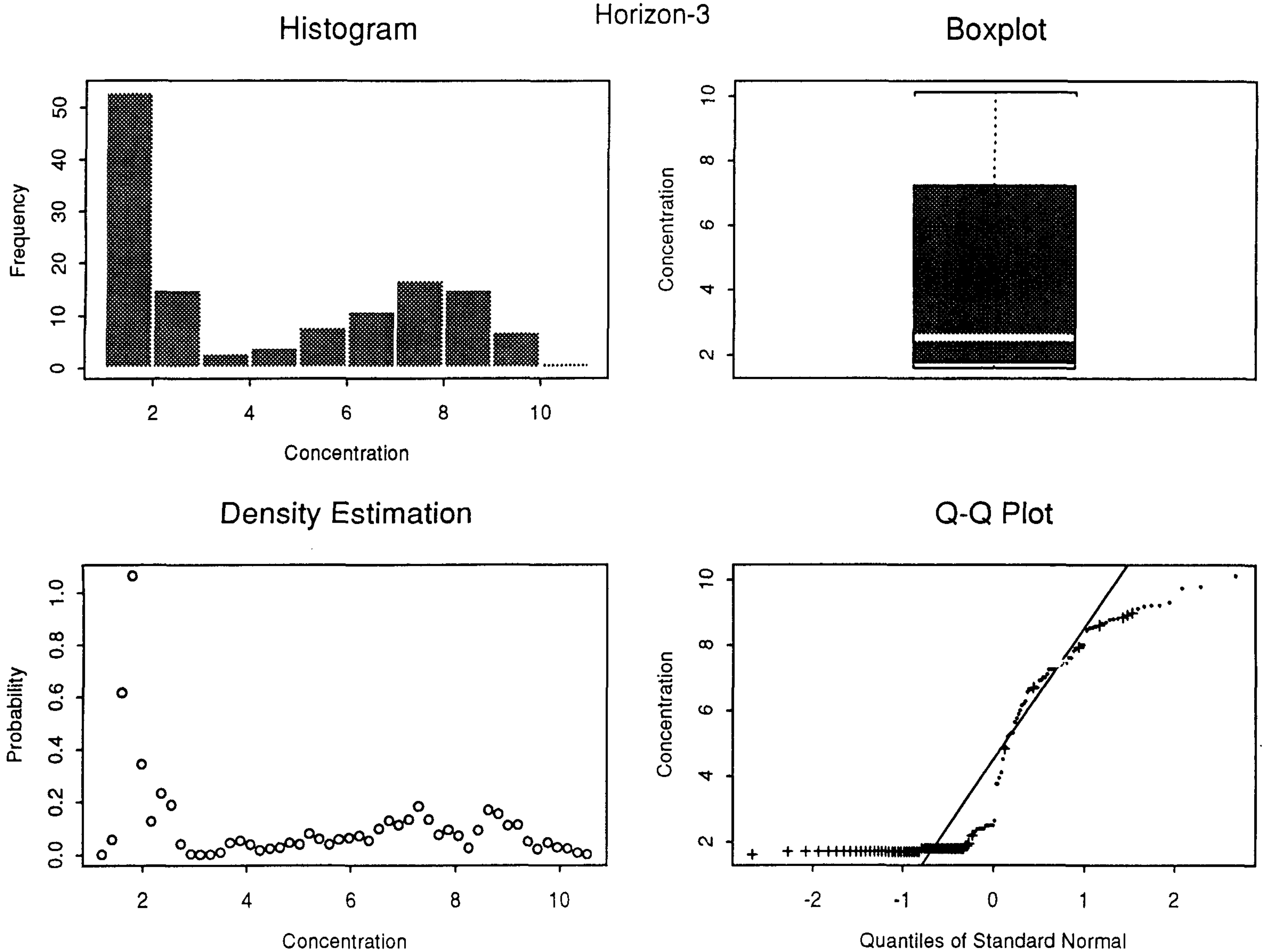
LOG-Arsenic
Horizon-3



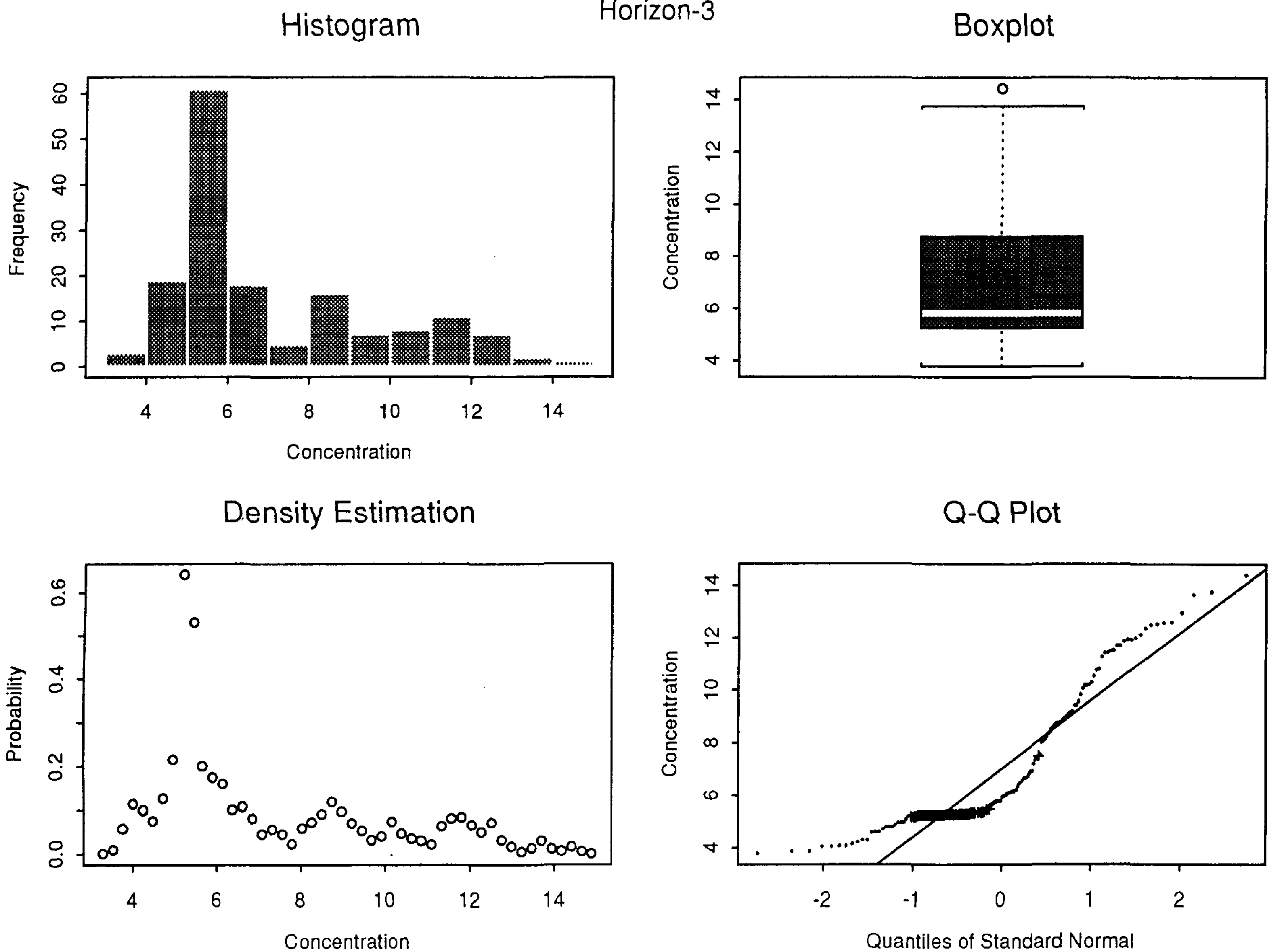
LOG-Anthracene
Horizon-3



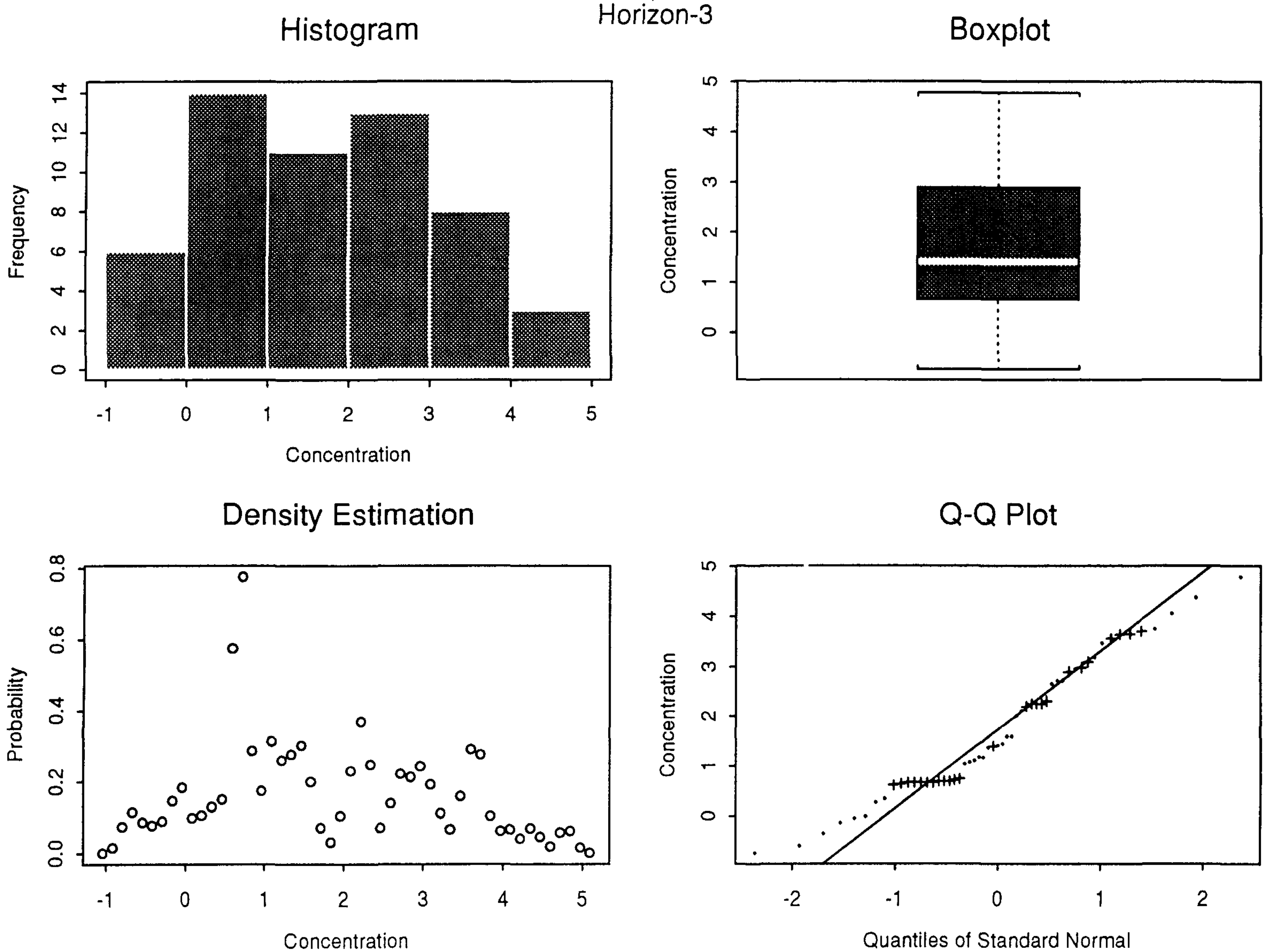
LOG-Acetone
Horizon-3



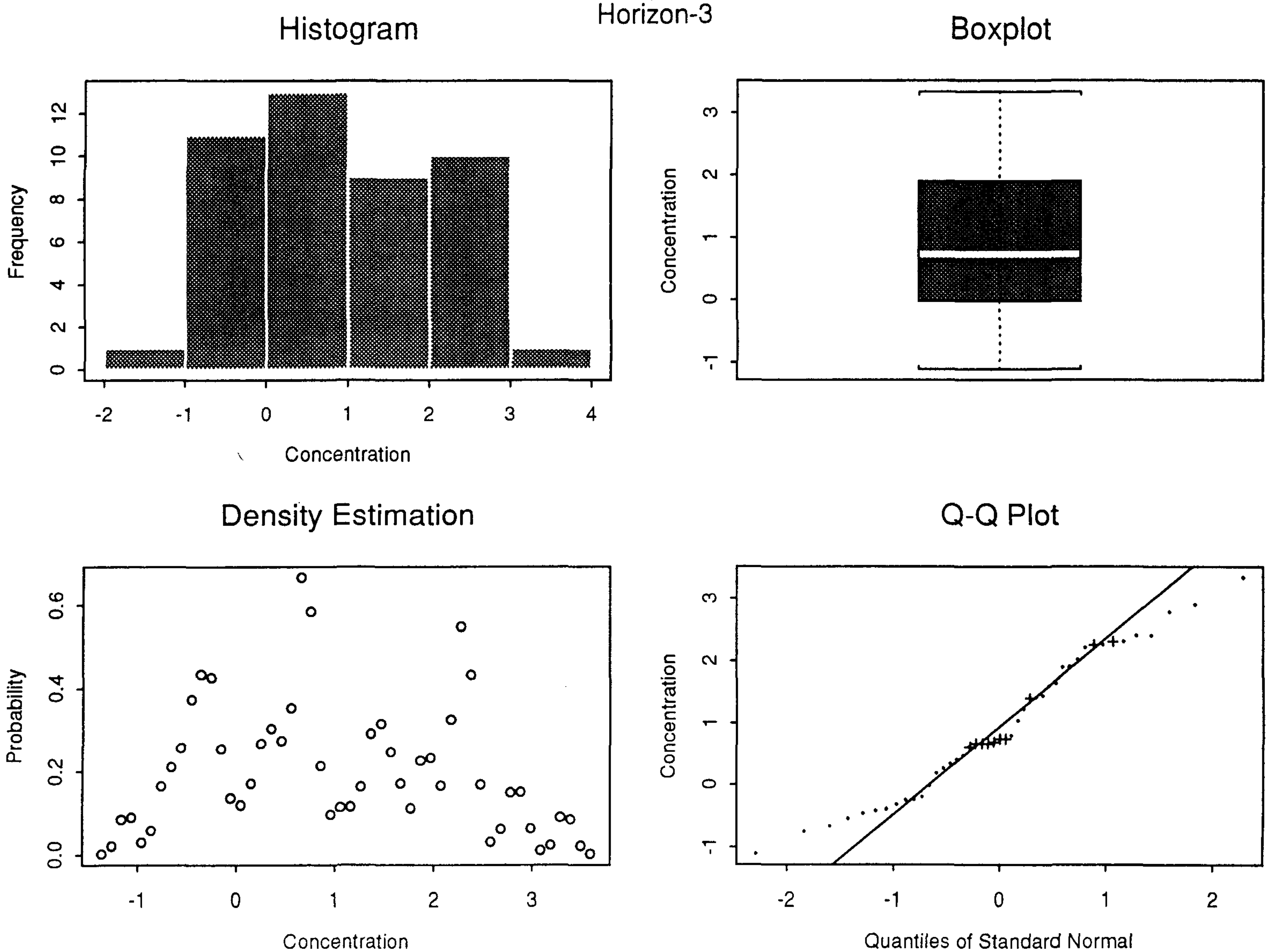
LOG-Acenaphthene
Horizon-3



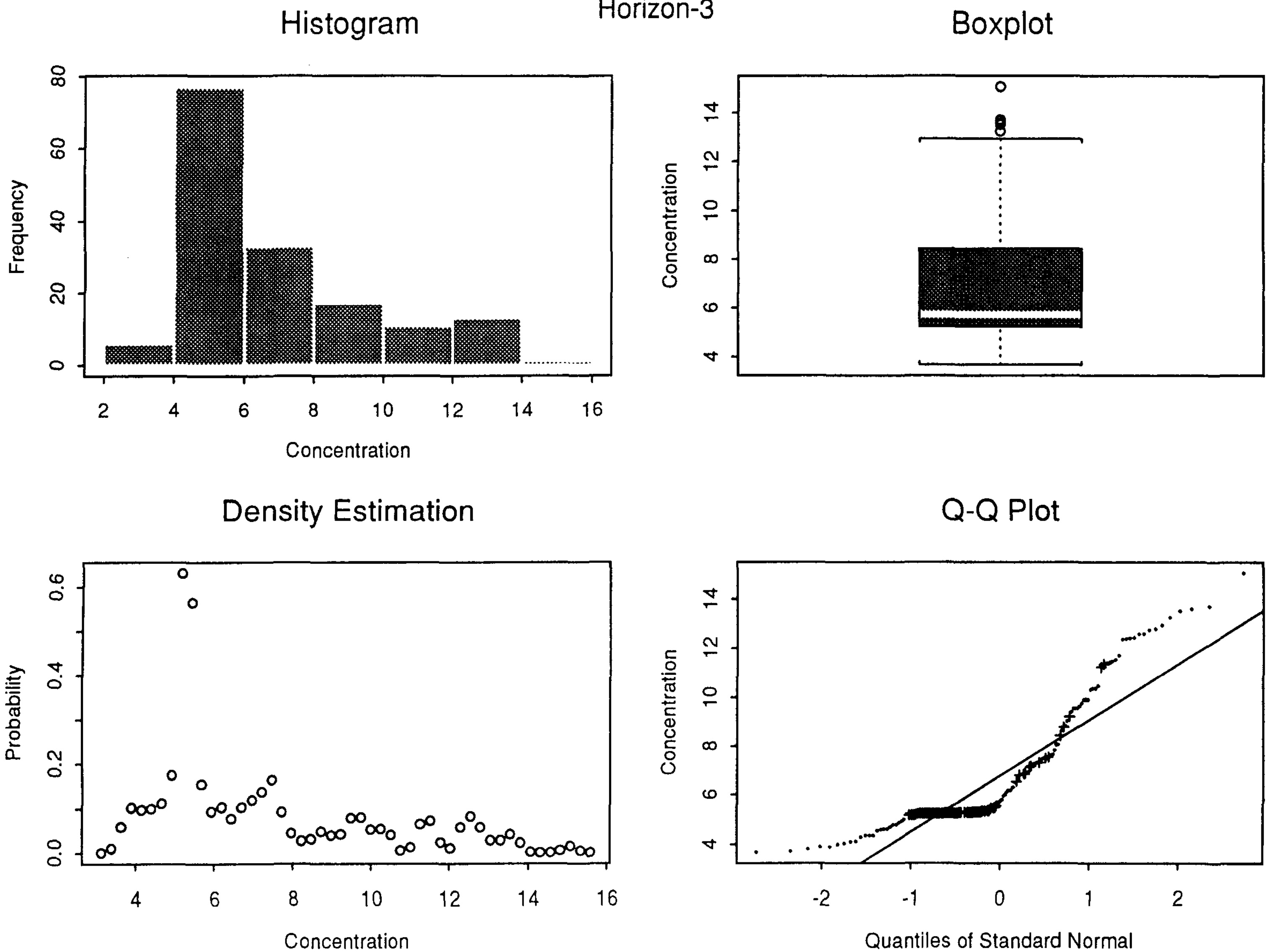
LOG-4,4'-DDT
Horizon-3



LOG-4,4'-DDE
Horizon-3



LOG-2-Methylnaphthalene
Horizon-3



APPENDIX B

HUMAN HEALTH CONSTITUENTS OF POTENTIAL CONCERN SCREENING

TABLE B.1
SCREENING AGAINST HUMAN HEALTH RBCs AND FREQUENCY OF DETECTION
SURFACE SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Class	Constituent	CAS Number	Risk-Based Concentration for Soil - Residential (1)		Maximum Detected Concentration	Retain Based on RBC Screen (2) Y/N	Frequency of Detection	Retained as COPC (3) Y/N
Chemical - units in mg/kg								
Volatiles	Acetone	67641	7.80E+02		2.50E+01	N	7/42	N
	Ethylbenzene	100414	7.80E+02		2.70E+01	N	1/42	N
	Methylene Chloride	75092	8.50E+01		1.40E-01	N	3/37	N
	Xylenes (total)	1330207	1.60E+04		5.60E+01	N	1/42	N
Semi-Volatiles	bis(2-ethylhexyl)Phthalate	117817	4.60E+01		1.00E+00	N	30/37	N
	Butylbenzylphthalate	85687	1.60E+03		9.20E-02	N	2/2	N
	Carbazole	86748	3.20E+01		5.40E+01	Y	25/42	Y
	Dibenzofuran	132649	3.10E+01		8.20E+01	Y	19/42	Y
PAHs	2-Methylnaphthalene	91576	3.10E+02		8.70E+01	N	19/52	N
	Acenaphthene	83329	4.70E+02		1.00E+02	N	31/52	N
	Acenaphthylene	208968	2.30E+02	b	8.10E-01	N	5/40	N
	Anthracene	120127	2.30E+03		1.90E+02	N	41/52	N
	Benzo(a)Anthracene	56553	8.70E-01		9.60E+01	Y	47/52	Y
	Benzo(a)pyrene	50328	8.70E-02		1.00E+02	Y	47/52	Y
	Benzo(b)fluoranthene	205992	8.70E-01		1.30E+02	Y	50/52	Y
	Benzo(g,h,i)perylene	191242	2.30E+02	b	4.10E+01	N	44/52	N
	Benzo(k)fluoranthene	207089	8.70E+00		5.90E+01	Y	43/52	Y
	Chrysene	218019	8.70E+01		9.80E+01	Y	48/52	Y
	Dibenz(a,h)anthracene	53703	8.70E-02		1.20E+01	Y	29/52	Y
	Fluoranthene	206440	3.10E+02		2.60E+02	N	51/52	N
	Fluorene	86737	3.10E+02		1.10E+02	N	28/52	N
	Indeno(1,2,3-cd)pyrene	193395	8.70E-01		4.30E+01	Y	43/52	Y
	Naphthalene	91203	3.10E+02		1.50E+02	N	28/52	N
	Phenanthrene	85018	2.30E+02	b	3.50E+02	Y	50/52	Y
	Pyrene	129000	2.30E+02		1.80E+02	N	49/52	N
Metals	Arsenic	7440382	4.30E-01	c	4.07E+01	Y	52/52	Y
	Barium	7440393	5.50E+02		2.22E+03	Y	52/52	Y
	Cadmium	7440439	7.80E+00		1.56E+01	Y	45/52	Y
	Chromium	7440473	3.90E+01		3.19E+02	Y	52/52	Y
	Lead	7439921	4.00E+02	d	1.61E+03	Y	52/52	Y
	Mercury	7439976	2.30E+00	e	2.00E+00	N	36/50	N
	Selenium	7782492	3.90E+01		1.60E+00	N	1/51	N
	Silver	7440224	3.90E+01		4.60E+00	N	7/52	N

TABLE B.1
SCREENING AGAINST HUMAN HEALTH RBCs AND FREQUENCY OF DETECTION
SURFACE SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Class	Constituent	CAS Number	Risk-Based Concentration for Soil - Residential (1)		Maximum Detected Concentration	Retain Based on RBC Screen (2) Y/N	Frequency of Detection	Retained as COPC (3) Y/N
Chemical - units in mg/kg								
Pesticides/	4,4'-DDD	72548	2.70E+00		6.20E-02	N	14/36	N
PCBs	4,4'-DDE	72559	1.90E+00		2.80E-02	N	30/37	N
	4,4'-DDT	50293	1.90E+00		1.20E-01	N	23/41	N
	alpha-BHC	319846	1.00E-01		3.20E-04	N	1/1	N
	alpha-Chlordane	5103719	1.80E+00	f	7.70E-02	N	31/42	N
	Aroclor-1254	11097691	3.20E-01	g	4.40E+00	Y	13/42	Y
	Dieldrin	60571	4.00E-02		1.40E-01	Y	34/42	Y
	Endosulfan I	959988	4.70E+01	i	4.80E-02	N	8/42	N
	Endosulfan II	33213659	4.70E+01	i	1.00E-02	N	18/35	N
	Endrin	72208	2.30E+00		8.60E-04	N	2/2	N
	gamma-Chlordane	5564347	1.80E+00	f	8.20E-03	N	17/30	N
	Heptachlor	76448	1.40E-01		2.30E-04	N	1/2	N
	Methoxychlor	72435	3.90E+01		1.50E-01	N	29/39	N
Miscellaneous	Total Cyanide	57125	1.60E+02		4.60E+00	N	19/52	N

Notes:

NR	No RBC value for this constituent
(1)	RBC = Risk Based Concentration. Comparisons were performed using the following criteria: cancer risk of 1E-06 and Hazard Index of 0.1. USEPA Region 3 RBC Table, April 1998.
(2)	Constituent was retained if the maximum concentration exceeded the RBC. If an RBC was not available, the constituent was retained.
(3)	COPC = Constituent of Potential Concern; constituent was retained if the maximum concentration exceeded the RBC and the frequency of detection was greater than 5%
a	Value for 1,3-dichloropropene
b	Value for pyrene used as surrogate.
c	RBC for arsenic as a carcinogen.
d	EPA Region IV action level for lead in soil.
e	Value for mercuric chloride
f	Value for Chlordane
g	Value for mixed Aroclors
h	Value for technical-HCH
I	Value for Endosulfan
j	Value for Endrin

TABLE B.2
SCREENING AGAINST HUMAN HEALTH RBCs AND FREQUENCY OF DETECTION
MIXED SURFACE AND SUBSURFACE SOIL (0 -10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Class	Constituent	CAS Number	Orig units	Risk-Based Concentration for Soil - Residential (1)		Maximum Detected Concentration	Retain Based on RBC Screen (2) Y/N	Frequency of Detection	Retained as COPC (3) Y/N
Chemical - units in mg/kg									
Volatiles	1,1,2,2-Tetrachloroethane	79345	ug/kg	3.20E+00		3.00E-03	N	1/1	N
	1,1-Dichloroethene	75354	ug/kg	1.10E+00		8.50E+00	Y	1/122	N
	2-Butanone	78933	ug/kg	4.70E+03		1.20E-02	N	2/79	N
	Acetone	67641	ug/kg	7.80E+02		2.50E+01	N	49/123	N
	Benzene	71432	ug/kg	2.20E+01		5.70E+01	Y	11/125	Y
	Chlorobenzene	108907	ug/kg	1.60E+02		8.00E+00	N	1/122	N
	Chloroform	67663	ug/kg	1.00E+02		8.00E-03	N	6/6	N
	Ethylbenzene	100414	ug/kg	7.80E+02		1.20E+02	N	19/125	N
	Methylene Chloride	75092	ug/kg	8.50E+01		1.40E-01	N	7/104	N
	Styrene	100425	ug/kg	1.60E+03		2.60E+01	N	5/125	N
	Tetrachloroethene	127184	ug/kg	1.20E+01		2.00E-03	N	2/2	N
	Toluene	108883	ug/kg	1.60E+03		1.10E+02	N	11/125	N
	Trichloroethene	79016	ug/kg	5.80E+01		7.90E+00	N	1/122	N
	Xylenes (total)	1330207	ug/kg	1.60E+04		4.30E+02	N	22/125	N
Semi-Volatiles	bis(2-ethylhexyl)Phthalate	117817	ug/kg	4.60E+01		1.00E+00	N	34/43	N
	Butylbenzylphthalate	85687	ug/kg	1.60E+03		9.20E-02	N	2/2	N
	Carbazole	86748	ug/kg	3.20E+01		2.20E+02	Y	42/63	Y
	Dibenzofuran	132649	ug/kg	3.10E+01		1.50E+02	Y	35/63	Y
PAHs	2-Methylnaphthalene	91576	ug/kg	3.10E+02		3.50E+03	Y	81/147	Y
	Acenaphthene	83329	ug/kg	4.70E+02		1.80E+03	Y	104/147	Y
	Acenaphthylene	208968	ug/kg	2.30E+02	b	8.10E+01	N	17/134	N
	Anthracene	120127	ug/kg	2.30E+03		2.40E+03	Y	122/147	Y
	Benzo(a)Anthracene	56553	ug/kg	8.70E-01		2.80E+03	Y	136/147	Y
	Benzo(a)pyrene	50328	ug/kg	8.70E-02		2.40E+03	Y	136/147	Y
	Benzo(b)fluoranthene	205992	ug/kg	8.70E-01		2.60E+03	Y	141/147	Y
	Benzo(g,h,i)perylene	191242	ug/kg	2.30E+02	b	9.60E+02	Y	129/147	Y
	Benzo(k)fluoranthene	207089	ug/kg	8.70E+00		1.40E+03	Y	129/147	Y
	Chrysene	218019	ug/kg	8.70E+01		3.90E+03	Y	140/147	Y
	Dibenz(a,h)anthracene	53703	ug/kg	8.70E-02		2.10E+02	Y	81/144	Y
	Fluoranthene	206440	ug/kg	3.10E+02		6.70E+03	Y	144/147	Y
	Fluorene	86737	ug/kg	3.10E+02		1.00E+03	Y	102/147	Y
	Indeno(1,2,3-cd)pyrene	193395	ug/kg	8.70E-01		9.00E+02	Y	126/147	Y
	Naphthalene	91203	ug/kg	3.10E+02		2.90E+03	Y	99/147	Y
	Phenanthrene	85018	ug/kg	2.30E+02	b	8.10E+03	Y	142/147	Y
	Pyrene	129000	ug/kg	2.30E+02		5.20E+03	Y	142/146	Y

TABLE B.2
SCREENING AGAINST HUMAN HEALTH RBCs AND FREQUENCY OF DETECTION
MIXED SURFACE AND SUBSURFACE SOIL (0 -10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Class	Constituent	CAS Number	Orig units	Risk-Based Concentration for Soil - Residential (1)		Maximum Detected Concentration	Retain Based on RBC Screen (2) Y/N	Frequency of Detection	Retained as COPC (3) Y/N
Chemical - units in mg/kg									
Metals	Arsenic	7440382	mg/kg	4.30E-01	c	8.64E+01	Y	147/147	Y
	Barium	7440393	mg/kg	5.50E+02		2.22E+03	Y	147/147	Y
	Cadmium	7440439	mg/kg	7.80E+00		3.64E+01	Y	121/147	Y
	Chromium	7440473	mg/kg	3.90E+01		3.69E+02	Y	147/147	Y
	Lead	7439921	mg/kg	4.00E+02	d	1.61E+03	Y	147/147	Y
	Mercury	7439976	mg/kg	2.30E+00	e	2.30E+00	N	105/141	N
	Selenium	7782492	mg/kg	3.90E+01		2.70E+00	N	18/145	N
	Silver	7440224	mg/kg	3.90E+01		1.10E+01	N	25/147	N
Pesticides/	4,4'-DDD	72548	ug/kg	2.70E+00		6.20E-02	N	18/49	N
PCBs	4,4'-DDE	72559	ug/kg	1.90E+00		2.80E-02	N	35/47	N
	4,4'-DDT	50293	ug/kg	1.90E+00		1.20E-01	N	30/57	N
	alpha-BHC	319846	ug/kg	1.00E-01		3.20E-04	N	1/1	N
	alpha-Chlordane	5103719	ug/kg	1.80E+00	f	7.70E-02	N	37/58	N
	Aroclor-1254	11097691	ug/kg	3.20E-01	g	4.40E+00	Y	16/62	Y
	Dieldrin	60571	ug/kg	4.00E-02		1.40E-01	Y	40/58	Y
	Endosulfan I	959988	ug/kg	4.70E+01	i	4.80E-02	N	10/57	N
	Endosulfan II	33213659	ug/kg	4.70E+01	i	3.00E-02	N	21/50	N
	Endrin	72208	ug/kg	2.30E+00		8.60E-04	N	3/3	N
	gamma-Chlordane	5564347	ug/kg	1.80E+00	f	8.20E-03	N	20/39	N
	Heptachlor	76448	ug/kg	1.40E-01		2.30E-04	N	1/2	N
	Methoxychlor	72435	ug/kg	3.90E+01		1.50E-01	N	40/56	N
Miscellaneous	Sulfur (D2015/300.0) (ug/g)		ug/g			2.33E+03	Y	12/12	Y
	Total Cyanide (mg/kg)	57125	mg/kg	1.60E+02		4.60E+00	N	52/147	N

Notes:

NR No RBC value for this constituent

(1) RBC = Risk Based Concentration. Comparisons were performed using the following criteria: cancer risk of 1E-06 and Hazard Index of 0.1. USEPA Region 3 RBC Table, April 1998.

(2) Constituent was retained if the maximum concentration exceeded the RBC. If an RBC was not available, the constituent was retained.

(3) COPC = Constituent of Potential Concern; constituent was retained if the maximum concentration exceeded the RBC and the frequency of detection was greater than 5%.

a Value for 1,3-dichloropropene
b Value for pyrene used as surrogate.
c RBC for arsenic as a carcinogen.
d EPA Region IV action level for lead in soil.
e Value for mercuric chloride
f Value for Chlordane
g Value for mixed Aroclors
h Value for technical-HCH
I Value for Endosulfan
j Value for Endrin

TABLE B.3
SCREENING AGAINST HUMAN HEALTH RBCs AND FREQUENCY OF DETECTION
MIXED SURFACE AND SUBSURFACE SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Class	Constituent	CAS Number	units out	Risk-Based Concentration for Soil - Residential (1)	Maximum Detected Concentration	Retain Based on RBC Screen (2) Y/N	Frequency of Detection	Retained as COPC (3) Y/N
Chemical - units in mg/kg								
Volatiles	1,1,2,2-Tetrachloroethane	79345	ug/kg	3.20E+00	3.00E-03	N	1/1	N
	1,1-Dichloroethene	75354	ug/kg	1.10E+00	8.50E+00	Y	1/140	N
	2-Butanone	78933	ug/kg	4.70E+03	3.50E-01	N	4/118	N
	4-Methyl-2-pentanone	108101	ug/kg	6.30E+02	2.50E-02	N	2/87	N
	Acetone	67641	ug/kg	7.80E+02	2.50E+01	N	64/145	N
	Benzene	71432	ug/kg	2.20E+01	5.70E+01	Y	18/147	Y
	Chlorobenzene	108907	ug/kg	1.60E+02	8.00E+00	N	1/140	N
	Chloroform	67663	ug/kg	1.00E+02	4.10E-02	N	7/93	N
	Ethylbenzene	100414	ug/kg	7.80E+02	1.20E+02	N	28/147	N
	Methylene Chloride	75092	ug/kg	8.50E+01	1.40E-01	N	10/117	N
	Styrene	100425	ug/kg	1.60E+03	2.60E+01	N	7/147	N
	Tetrachloroethene	127184	ug/kg	1.20E+01	2.00E-03	N	2/2	N
	Toluene	108883	ug/kg	1.60E+03	1.10E+02	N	18/147	N
	Trichloroethene	79016	ug/kg	5.80E+01	7.90E+00	N	1/140	N
	Xylenes (total)	1330207	ug/kg	1.60E+04	4.30E+02	N	31/147	N
Semi-	4-Methylphenol	106445	ug/kg	3.90E+01	4.20E+01	Y	1/60	N
Volatiles	bis(2-ethylhexyl)Phthalate	117817	ug/kg	4.60E+01	1.00E+00	N	34/44	N
	Butylbenzylphthalate	85687	ug/kg	1.60E+03	9.20E-02	N	2/2	N
	Carbazole	86748	ug/kg	3.20E+01	2.20E+02	Y	45/66	Y
	Dibenzofuran	132649	ug/kg	3.10E+01	1.50E+02	Y	38/66	Y
	Phenol	108952	ug/kg	4.70E+03	2.30E+01	N	1/60	N
PAHs	2-Methylnaphthalene	91576	ug/kg	3.10E+02	3.50E+03	Y	95/173	Y
	Acenaphthene	83329	ug/kg	4.70E+02	1.80E+03	Y	120/173	Y
	Acenaphthylene	208968	ug/kg	2.30E+02 b	8.10E+01	N	21/156	N
	Anthracene	120127	ug/kg	2.30E+03	2.40E+03	Y	139/173	Y
	Benzo(a)Anthracene	56553	ug/kg	8.70E-01	2.80E+03	Y	154/173	Y
	Benzo(a)pyrene	50328	ug/kg	8.70E-02	2.40E+03	Y	151/173	Y
	Benzo(b)fluoranthene	205992	ug/kg	8.70E-01	2.60E+03	Y	157/173	Y
	Benzo(g,h,i)perylene	191242	ug/kg	2.30E+02 b	9.60E+02	Y	141/173	Y
	Benzo(k)fluoranthene	207089	ug/kg	8.70E+00	1.40E+03	Y	143/173	Y
	Chrysene	218019	ug/kg	8.70E+01	3.90E+03	Y	158/173	Y
	Dibenz(a,h)anthracene	53703	ug/kg	8.70E-02	2.10E+02	Y	87/169	Y
	Fluoranthene	206440	ug/kg	3.10E+02	6.70E+03	Y	165/173	Y
	Fluorene	86737	ug/kg	3.10E+02	1.00E+03	Y	119/173	Y
	Indeno(1,2,3-cd)pyrene	193395	ug/kg	8.70E-01	9.00E+02	Y	139/173	Y
	Naphthalene	91203	ug/kg	3.10E+02	2.90E+03	Y	115/173	Y
	Phenanthrene	85018	ug/kg	2.30E+02 b	8.10E+03	Y	166/173	Y
	Pyrene	129000	ug/kg	2.30E+02	5.20E+03	Y	163/172	Y

T... E B.3
SCREENING AGAINST HUMAN HEALTH RBCs AND FREQUENCY OF DETECTION
MIXED SURFACE AND SUBSURFACE SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Class	Constituent	CAS Number	units out	Risk-Based Concentration for Soil - Residential (1)		Maximum Detected Concentration	Retain Based on RBC Screen (2) Y/N	Frequency of Detection	Retained as COPC (3) Y/N
Chemical - units in mg/kg									
Metals	Arsenic	7440382	mg/kg	4.30E-01	c	1.04E+02	Y	173/173	Y
	Barium	7440393	mg/kg	5.50E+02		2.22E+03	Y	173/173	Y
	Cadmium	7440439	mg/kg	7.80E+00		3.64E+01	Y	132/173	Y
	Chromium	7440473	mg/kg	3.90E+01		3.69E+02	Y	173/173	Y
	Lead	7439921	mg/kg	4.00E+02	d	2.68E+03	Y	173/173	Y
	Mercury	7439976	mg/kg	2.30E+00	e	2.71E+01	Y	113/164	Y
	Selenium	7782492	mg/kg	3.90E+01		2.53E+01	N	21/171	N
	Silver	7440224	mg/kg	3.90E+01		1.10E+01	N	27/173	N
Pesticides/	4,4'-DDD	72548	ug/kg	2.70E+00		6.20E-02	N	19/52	N
PCBs	4,4'-DDE	72559	ug/kg	1.90E+00		2.80E-02	N	35/49	N
	4,4'-DDT	50293	ug/kg	1.90E+00		1.20E-01	N	30/60	N
	alpha-BHC	319846	ug/kg	1.00E-01		3.20E-04	N	1/1	N
	alpha-Chlordane	5103719	ug/kg	1.80E+00	f	7.70E-02	N	38/61	N
	Aroclor-1254	11097691	ug/kg	3.20E-01	g	4.40E+00	Y	16/65	Y
	Dieldrin	60571	ug/kg	4.00E-02		1.40E-01	Y	40/61	Y
	Endosulfan I	959988	ug/kg	4.70E+01	i	4.80E-02	N	10/60	N
	Endosulfan II	33213659	ug/kg	4.70E+01	i	3.00E-02	N	22/52	N
	Endrin	72208	ug/kg	2.30E+00		8.60E-04	N	3/3	N
	gamma-Chlordane	5564347	ug/kg	1.80E+00	f	8.20E-03	N	20/41	N
	Heptachlor	76448	ug/kg	1.40E-01		2.30E-04	N	1/2	N
	Methoxychlor	72435	ug/kg	3.90E+01		1.50E-01	N	40/58	N
Miscellaneous	Sulfur (D2015/300.0) (ug/g)		ug/g			2.33E+03	Y	14/14	Y
	Total Cyanide (mg/kg)	57125	mg/kg	1.60E+02		9.50E+00	N	57/173	N

Notes:

NR	No RBC value for this constituent
NA	Screening not applicable for this constituent
ND	Background concentration not determined
(1)	RBC = Risk Based Concentration. Comparisons were performed using the following criteria: cancer risk of 1E-06 and Hazard Index of 0.1. USEPA Region 3 RBC Table, April 1998.
(2)	Constituent was retained if the maximum concentration exceeded the RBC. If an RBC was not available, the constituent was retained.
(4)	RDA - Recommended Daily Allowances; SADI - Safe and Adequate Daily Intake (National Academy of Sciences, 1989).
(5)	Chronic Daily Intake derived by multiplying the maximum concentration in soil (mg/kg) by an intake value of 0.0002 kg/day (200 mg/day for a child).
(6)	*Nutrients were eliminated if the CDI was below the RDA or SADI.*
(7)	Background screening only applies to inorganic constituents. Jan.1998.
(3)	COPC = Constituent of Potential Concern; constituent was retained if the maximum concentration exceeded the RBC and the frequency of detection was greater than 5%.
a	Value for 1,3-dichloropropene
b	Value for pyrene used as surrogate.
c	RBC for arsenic as a carcinogen.
d	EPA Region IV action level for lead in soil.
e	Value for mercuric chloride
f	Value for Chlordane
g	Value for mixed Aroclors
h	Value for technical-HCH
I	Value for Endosulfan
j	Value for Endrin

APPENDIX C

RISK CALCULATION TABLES

APPENDIX C.1

RISK CALCULATION TABLES
(0 - 0.05 FEET)

TABLE C.1.1
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adolescent Trespasser RME(1)	CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 2.17E-08
CT CIF = 5.44E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.52E-07
CT NIF = 3.81E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	1.8E-09	<1%	4.6E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	1.4E-07	06%	3.5E-08	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	1.3E-06	56%	3.2E-07	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	2.1E-07	09%	5.3E-08	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	7.5E-09	<1%	1.9E-09	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	1.6E-09	<1%	4.0E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	2.0E-07	09%	5.0E-08	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	6.9E-08	03%	1.7E-08	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Arochlor - 1254	4.11E-01	2.00E+00	2.00E-05	1.8E-08	<1%	4.5E-09	<1%	3.1E-03	28%	7.8E-04	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	5.9E-09	<1%	1.5E-09	<1%	5.1E-05	<1%	1.3E-05	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	3.6E-07	16%	9.0E-08	16%	5.6E-03	51%	1.4E-03	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	3.8E-04	03%	9.6E-05	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	6.2E-04	06%	1.5E-04	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	1.3E-03	12%	3.2E-04	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-06	98%	6E-07	98%	1E-02	100%	3E-03	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.2
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER DERMAL EXPOSURE TO SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adolescent Trespasser RME(1)	Adolescent Trespasser CT(1)		
Skin Surface Area (SA), cm^2/event	4400	3350		
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2	RME CIF =	1.91E-06
Exposure Frequency (EF), events/yr	50	25	CT CIF =	1.46E-07
Exposure Duration (ED), yrs	10	10		
Body Weight (BW), kg	45	45		
Avging Time, Carc(2) (ATC), days	25,550	25,550	RME NIF =	1.34E-05
Avging Time, Noncarc(3) (ATN), days	3,650	3,650	CT NIF =	1.02E-06
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06		

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.0E-02	00%	<1%	00%	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.0E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.0E-02	00%	7.2E-02	00%	7.2E-02	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.0E-02	00%	6.6E-01	00%	6.6E-01	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.0E-02	00%	1.1E-01	00%	1.1E-01	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.0E-02	00%	<1%	00%	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.0E-02	00%	<1%	00%	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.0E-02	00%	1.0E-01	00%	1.0E-01	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.0E-02	00%	3.5E-02	00%	3.5E-02	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.0E-02	--	--	--	--	--	--	--	--
Pesticides/PCBs												
Arochlor - 1254	4.11E-01	2.22E+00	1.80E-05	1.0E-02	00%	<1%	00%	<1%	00%	2.4E-01	00%	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.0E-02	00%	<1%	00%	<1%	00%	<1%	00%	<1%
											--	--
Metals											--	--
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.0E-03	00%	1.1E-02	00%	1.1E-02	00%	4.8E-02	00%	05%
Barium	1.77E+02	--	3.50E-03	1.0E-03	--	--	--	--	00%	5.3E-02	00%	05%
Cadmium	2.03E+00	--	1.00E-05	1.0E-03	--	--	--	--	00%	2.1E-01	00%	21%
Chromium	4.23E+01	--	1.00E-04	1.0E-03	--	--	--	--	01%	4.4E-01	00%	44%
Lead	1.57E+02	--	--	1.0E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	3.E-06	99%	3.E-07	99%	1.E-02	99%	1.E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.1.3
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adolescent Trespasser RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.44E-03
CT CIF = 3.61E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.01E-02
CT NIF = 2.53E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

		Toxicity Values (7)		Cancer Risk (8)				Hazard Quotient (9)			
Constituent	EP Conc(6) (mg/kg)	IUR (m^3/µg)	RfC (mg/m^3)	RME	% of Total	CT	% of Total	RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	5.4E-12	<1%	1.4E-12	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	4.9E-11	01%	1.2E-11	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	8.1E-12	<1%	2.0E-12	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	2.9E-13	<1%	7.2E-14	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	6.1E-14	<1%	1.5E-14	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	7.6E-12	<1%	1.9E-12	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	2.6E-12	<1%	6.6E-13	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Arochlor - 1254	4.11E-01	1.00E-04	--	2.8E-13	<1%	7.1E-14	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	5.4E-13	<1%	1.3E-13	<1%	--	--	--	--
Metals						--	--				
Arsenic	1.10E+01	4.30E-03	--	3.3E-10	08%	8.1E-11	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	1.7E-05	100%	4.3E-06	100%
Cadmium	2.03E+00	1.80E-03	--	2.5E-11	<1%	6.3E-12	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	3.5E-09	89%	8.7E-10	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	4E-09	99%	1E-09	99%	2E-05	100%	4E-06	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF = 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.1.4
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER INHALATION OF VOLATILE SOIL CONTAMINATNS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adolescent Trespasser RME(1)	Adolescent Trespasser CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.44E-03
CT CIF = 3.61E-04
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.01E-02
CT NIF = 2.53E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
No volatiles in this media.												
				PATHWAY SUMS:	**NC**		**NC**		**NC**		**NC**	

Notes:
NC - not calculable due to lack of toxicity or other chemical-specific information.
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.5
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 1.75E-07
CT CIF = 1.64E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 4.89E-07
CT NIF = 2.29E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	1.5E-08	<1%	1.4E-09	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	1.1E-06	06%	1.1E-07	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	1.0E-05	56%	9.7E-07	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	1.7E-06	09%	1.6E-07	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	6.0E-08	<1%	5.6E-09	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	1.3E-08	<1%	1.2E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	1.6E-06	09%	1.5E-07	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	5.5E-07	03%	5.2E-08	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Arochlor - 1254	4.11E-01	2.00E+00	2.00E-05	1.4E-07	<1%	1.3E-08	<1%	1.0E-02	28%	4.7E-03	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	4.7E-08	<1%	4.4E-09	<1%	1.7E-04	<1%	7.7E-05	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	2.9E-06	16%	2.7E-07	16%	1.8E-02	51%	8.4E-03	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	1.2E-03	03%	5.8E-04	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	2.0E-03	06%	9.3E-04	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	4.1E-03	12%	1.9E-03	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-05	98%	2E-06	98%	4E-02	100%	2E-02	100%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989 and 1992).
6. Exposure point concentration, RME.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.6
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	CT(1)	
Skin Surface Area (SA), cm^2/event	5800	5000	
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2	RME CIF = 2.03E-05
Exposure Frequency (EF), events/yr	250	234	CT CIF = 6.54179E-07
Exposure Duration (ED), yrs	25	5	
Body Weight (BW), kg	70	70	
Avging Time, Carc(2) (ATC), days	25,550	25,550	RME NIF = 5.68E-05
Avging Time, Noncarc(3) (ATN), days	9,125	1,825	CT NIF = 9.15851E-06
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06	

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.00E-02	3.4E-08	<1%	1.1E-09	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.00E-02	2.6E-06	07%	8.5E-08	07%	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.00E-02	2.4E-05	66%	7.7E-07	66%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.00E-02	4.0E-06	11%	1.3E-07	11%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.00E-02	1.4E-07	<1%	4.5E-09	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.00E-02	3.0E-08	<1%	9.5E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.00E-02	3.7E-06	10%	1.2E-07	10%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.00E-02	1.3E-06	04%	4.2E-08	04%	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pesticides/PCBs												
Arochlor - 1254	4.11E-01	2.22E+00	1.80E-05	1.00E-02	1.9E-07	<1%	6.0E-09	<1%	1.3E-02	24%	2.1E-03	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.00E-02	1.1E-07	<1%	3.5E-09	<1%	3.8E-04	<1%	6.2E-05	<1%
Metals											--	--
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.00E-03	4.2E-07	01%	1.3E-08	01%	2.6E-03	05%	4.2E-04	05%
Barium	1.77E+02	--	3.50E-03	1.00E-03	--	--	--	--	2.9E-03	05%	4.6E-04	05%
Cadmium	2.03E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.2E-02	21%	1.9E-03	21%
Chromium	4.23E+01	--	1.00E-04	1.00E-03	--	--	--	--	2.4E-02	44%	3.9E-03	44%
Lead	1.57E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	4E-05	99%	1E-06	99%	5E-02	99%	9E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).

TABLE C.1.7
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.49E-02
CT CIF = 6.54E-03

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	1.3E-10	<1%	2.5E-11	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	1.2E-09	01%	2.2E-10	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	2.0E-10	<1%	3.7E-11	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	6.9E-12	<1%	1.3E-12	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	1.5E-12	<1%	2.7E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	1.8E-10	<1%	3.4E-11	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	6.4E-11	<1%	1.2E-11	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Arochlor - 1254	4.11E-01	1.00E-04	--	6.9E-12	<1%	1.3E-12	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	1.3E-11	<1%	2.4E-12	<1%	--	--	--	--
Metals						--	--				
Arsenic	1.10E+01	4.30E-03	--	7.9E-09	08%	1.5E-09	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	1.7E-04	100%	1.5E-04	100%
Cadmium	2.03E+00	1.80E-03	--	6.1E-10	<1%	1.1E-10	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	8.5E-08	89%	1.6E-08	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	9E-08	99%	2E-08	99%	2E-04	100%	2E-04	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg),
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

PEF = 7.33E+08

TABLE C.1.8
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.49E-02
CT CIF = 6.54E-03

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
No volatiles in the media.												
PATHWAY SUMS:					NC		NC		NC		NC	

Notes:

NC - not calculable due to lack of toxicity or other chemical-specific information.

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.9
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	Construction Worker CT(1)
Intake Rate (IR), mg/day	480	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 3.35E-08
CT CIF = 6.54E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 2.35E-06
CT NIF = 4.58E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	Toxicity Values(7) ORfD (mg/kg-d)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	2.9E-09	<1%	5.6E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	2.2E-07	06%	4.3E-08	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	2.0E-06	56%	3.9E-07	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	3.3E-07	09%	6.4E-08	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	1.2E-08	<1%	2.3E-09	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	2.4E-09	<1%	4.8E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	3.1E-07	09%	6.0E-08	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	1.1E-07	03%	2.1E-08	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	2.00E+00	2.00E-05	2.8E-08	<1%	5.4E-09	<1%	4.8E-02	28%	9.4E-03	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	9.1E-09	<1%	1.8E-09	<1%	7.9E-04	<1%	1.5E-04	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	5.5E-07	16%	1.1E-07	16%	8.6E-02	51%	1.7E-02	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	5.9E-03	03%	1.2E-03	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	9.5E-03	06%	1.9E-03	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	2.0E-02	12%	3.9E-03	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	4E-06	98%	7E-07	98%	2E-01	100%	3E-02	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.10
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	Construction Worker CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 8.11E-07
CT CIF = 1.31E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 5.68E-05
CT NIF = 9.16E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	Toxicity Values(7) DRfD (mg/kg-d)	Toxicity Values(7) DABS (unitless)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.00E-02	1.4E-09	<1%	2.2E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.00E-02	1.1E-07	07%	1.7E-08	07%	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.00E-02	9.6E-07	66%	1.5E-07	66%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.00E-02	1.6E-07	11%	2.6E-08	11%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.00E-02	5.6E-09	<1%	9.0E-10	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.00E-02	1.2E-09	<1%	1.9E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.00E-02	1.5E-07	10%	2.4E-08	10%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.00E-02	5.1E-08	04%	8.3E-09	04%	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pesticides/PCBs												
Aroclor-1254	4.11E-01	2.22E+00	1.80E-05	1.00E-02	7.4E-09	<1%	1.2E-09	<1%	1.3E-02	24%	2.1E-03	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.00E-02	4.4E-09	<1%	7.1E-10	<1%	3.8E-04	<1%	6.2E-05	<1%
Metals												
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.00E-03	1.7E-08	01%	2.7E-09	01%	2.6E-03	05%	4.2E-04	05%
Barium	1.77E+02	--	3.50E-03	1.00E-03	--	--	--	--	2.9E-03	05%	4.6E-04	05%
Cadmium	2.03E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.2E-02	21%	1.9E-03	21%
Chromium	4.23E+01	--	1.00E-04	1.00E-03	--	--	--	--	2.4E-02	44%	3.9E-03	44%
Lead	1.57E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	1.E-06	99%	2.E-07	99%	5.E-02	99%	9.E-03	99%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.1.11
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR ($m^3/\mu g$)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	5.2E-12	<1%	4.9E-12	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	4.7E-11	01%	4.4E-11	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	7.9E-12	<1%	7.4E-12	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	2.8E-13	<1%	2.6E-13	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	5.9E-14	<1%	5.5E-14	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	7.3E-12	<1%	6.9E-12	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	2.6E-12	<1%	2.4E-12	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	1.00E-04	--	2.7E-13	<1%	2.6E-13	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	5.2E-13	<1%	4.9E-13	<1%	--	--	--	--
Metals						--	--				
Arsenic	1.10E+01	4.30E-03	--	3.2E-10	08%	3.0E-10	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	1.7E-04	100%	1.5E-04	100%
Cadmium	2.03E+00	1.80E-03	--	2.4E-11	<1%	2.3E-11	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	3.4E-09	89%	3.2E-09	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**4E-09**	**99%**	**4E-09**	**99%**	**2E-04**	**100%**	**2E-04**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg),
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3 7.33E+08
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.1.12
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)

	Construction Worker RME(1)	Construction Worker CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
No volatiles in the media.												
				PATHWAY SUMS:	NC		NC		NC		NC	

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.13
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME(1)	Adult Recreator CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 6.71E-08
CT CIF = 4.89E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.96E-07
CT NIF = 4.89E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

		Toxicity Values (7)		Cancer Risk(8)				Hazard Quotient(9)			
Constituent	EP Conc(6) (mg/kg)	OSF (kg-d/mg)	ORfD (mg/kg-d)	RME	% of Total	CT	% of Total	RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	5.7E-09	<1%	4.2E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	4.4E-07	06%	3.2E-08	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	4.0E-06	56%	2.9E-07	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	6.6E-07	09%	4.8E-08	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	2.3E-08	<1%	1.7E-09	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	4.9E-09	<1%	3.6E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	6.1E-07	09%	4.5E-08	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	2.1E-07	03%	1.6E-08	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	2.00E+00	2.00E-05	5.5E-08	<1%	4.0E-09	<1%	4.0E-03	28%	1.0E-03	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	1.8E-08	<1%	1.3E-09	<1%	6.6E-05	<1%	1.7E-05	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	1.1E-06	16%	8.1E-08	16%	7.2E-03	51%	1.8E-03	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	4.9E-04	03%	1.2E-04	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	7.9E-04	06%	2.0E-04	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	1.7E-03	12%	4.1E-04	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	7E-06	98%	5E-07	98%	1E-02	100%	4E-03	100%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.14
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - DERMAL EXPOSURE TO SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 7.78E-06
CT CIF = 1.96E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 2.27E-05
CT NIF = 1.96E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.00E-02	1.3E-08	<1%	3.3E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.00E-02	1.0E-06	07%	2.5E-08	07%	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.00E-02	9.2E-06	66%	2.3E-07	66%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.00E-02	1.5E-06	11%	3.8E-08	11%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.00E-02	5.4E-08	<1%	1.4E-09	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.00E-02	1.1E-08	<1%	2.9E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.00E-02	1.4E-06	10%	3.6E-08	10%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.00E-02	4.9E-07	04%	1.2E-08	04%	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pesticides/PCBs												
Aroclor-1254	4.11E-01	2.22E+00	1.80E-05	1.00E-02	7.1E-08	<1%	1.8E-09	<1%	5.2E-03	24%	4.5E-04	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.00E-02	4.2E-08	<1%	1.1E-09	<1%	1.5E-04	<1%	1.3E-05	<1%
Metals											--	--
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.00E-03	1.6E-07	01%	4.0E-09	01%	1.0E-03	05%	9.0E-05	05%
Barium	1.77E+02	--	3.50E-03	1.00E-03	--	--	--	--	1.1E-03	05%	9.9E-05	05%
Cadmium	2.03E+00	--	1.00E-05	1.00E-03	--	--	--	--	4.6E-03	21%	4.0E-04	21%
Chromium	4.23E+01	--	1.00E-04	1.00E-03	--	--	--	--	9.6E-03	44%	8.3E-04	44%
Lead	1.57E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	1.E-05	99%	4.E-07	99%	2.E-02	99%	2.E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.1.15
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME(1)	Adult Recreator CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 4.46E-03
CT CIF = 3.25E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.30E-02
CT NIF = 3.25E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	Toxicity Values (7) RfC (mg/m^3)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	1.7E-11	<1%	1.2E-12	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	1.5E-10	01%	1.1E-11	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	2.5E-11	<1%	1.8E-12	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	8.8E-13	<1%	6.5E-14	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	1.9E-13	<1%	1.4E-14	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	2.3E-11	<1%	1.7E-12	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	8.1E-12	<1%	5.9E-13	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	1.00E-04	--	8.7E-13	<1%	6.4E-14	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	1.7E-12	<1%	1.2E-13	<1%	--	--	--	--
Metals											
Arsenic	1.10E+01	4.30E-03	--	1.0E-09	08%	7.3E-11	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	2.2E-05	100%	5.5E-06	100%
Cadmium	2.03E+00	1.80E-03	--	7.8E-11	<1%	5.7E-12	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	1.1E-08	89%	7.9E-10	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	1E-08	99%	9E-10	99%	2E-05	100%	5E-06	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per y

PEF = 7.33E+08

4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.1.16
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)

	Adult Recreator RME(1)	Adult Recreator CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 4.46E-03
CT CIF = 3.25E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.30E-02
CT NIF = 3.25E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	Toxicity Values(7) RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Volatiles												
No volatiles in the media.												
				PATHWAY SUMS:	NC		NC		NC		NC	

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.17
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	CT(1)
Intake Rate (IR), mg/day	200	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 1.57E-07
CT CIF = 1.30E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.83E-06
CT NIF = 4.57E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	1.3E-08	<1%	1.1E-09	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	1.0E-06	06%	8.5E-08	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	9.2E-06	56%	7.7E-07	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	1.5E-06	09%	1.3E-07	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	5.4E-08	<1%	4.5E-09	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	1.1E-08	<1%	9.5E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	1.4E-06	09%	1.2E-07	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	5.0E-07	03%	4.1E-08	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	2.00E+00	2.00E-05	1.3E-07	<1%	1.1E-08	<1%	3.8E-02	28%	9.4E-03	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	4.2E-08	<1%	3.5E-09	<1%	6.2E-04	<1%	1.5E-04	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	2.6E-06	16%	2.2E-07	16%	6.7E-02	51%	1.7E-02	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	4.6E-03	03%	1.2E-03	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	7.4E-03	06%	1.9E-03	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	1.5E-02	12%	3.9E-03	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-05	98%	1E-06	98%	1E-01	100%	3E-02	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.18
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - DERMAL EXPOSURE TO SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	2300	1980
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 3.60E-06
CT CIF = 1.03E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 4.20E-05
CT NIF = 3.62E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.00E-02	6.1E-09	<1%	1.8E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.00E-02	4.7E-07	07%	1.3E-08	07%	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.00E-02	4.3E-06	66%	1.2E-07	66%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.00E-02	7.0E-07	11%	2.0E-08	11%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.00E-02	2.5E-08	<1%	7.1E-10	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.00E-02	5.2E-09	<1%	1.5E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.00E-02	6.6E-07	10%	1.9E-08	10%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.00E-02	2.3E-07	04%	6.6E-09	04%	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pesticides/PCBs												
Aroclor-1254	4.11E-01	2.22E+00	1.80E-05	1.00E-02	3.3E-08	<1%	9.4E-10	<1%	9.6E-03	24%	8.3E-04	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.00E-02	1.9E-08	<1%	5.6E-10	<1%	2.8E-04	<1%	2.4E-05	<1%
Metals												
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.00E-03	7.4E-08	01%	2.1E-09	01%	1.9E-03	05%	1.7E-04	05%
Barium	1.77E+02	--	3.50E-03	1.00E-03	--	--	--	--	2.1E-03	05%	1.8E-04	05%
Cadmium	2.03E+00	--	1.00E-05	1.00E-03	--	--	--	--	8.5E-03	21%	7.3E-04	21%
Chromium	4.23E+01	--	1.00E-04	1.00E-03	--	--	--	--	1.8E-02	44%	1.5E-03	44%
Lead	1.57E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	6.E-06	99%	2.E-07	99%	4.E-02	99%	3.E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.1.19
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - .05 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.91E-03
CT CIF = 3.26E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 4.57E-02
CT NIF = 1.14E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	1.5E-11	<1%	1.2E-12	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	1.3E-10	01%	1.1E-11	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	2.2E-11	<1%	1.8E-12	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	7.8E-13	<1%	6.5E-14	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	1.6E-13	<1%	1.4E-14	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	2.1E-11	<1%	1.7E-12	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	7.1E-12	<1%	6.0E-13	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	1.00E-04	--	7.7E-13	<1%	6.4E-14	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	1.5E-12	<1%	1.2E-13	<1%	--	--	--	--
				--	--	--	--	--	--	--	--
Metals				--	--	--	--	--	--	--	--
Arsenic	1.10E+01	4.30E-03	--	8.8E-10	08%	7.4E-11	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	7.7E-05	100%	1.9E-05	100%
Cadmium	2.03E+00	1.80E-03	--	6.8E-11	<1%	5.7E-12	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	9.5E-09	89%	7.9E-10	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	1E-08	99%	9E-10	99%	8E-05	100%	2E-05	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF = 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.1.20
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
ME CIF = 3.91E-03
CT CIF = 3.26E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
ME NIF = 4.57E-02
CT NIF = 1.14E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
No volatiles in the media.												
				PATHWAY SUMS:	NC		NC		NC		NC	

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.21
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 2.35E-07
CT CIF = 2.45E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 6.85E-07
CT NIF = 2.45E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	2.0E-08	<1%	2.1E-09	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	1.5E-06	06%	1.6E-07	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	1.4E-05	56%	1.4E-06	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	2.3E-06	09%	2.4E-07	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	8.1E-08	<1%	8.4E-09	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	1.7E-08	<1%	1.8E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	2.1E-06	09%	2.2E-07	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	7.5E-07	03%	7.8E-08	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	2.00E+00	2.00E-05	1.9E-07	<1%	2.0E-08	<1%	1.4E-02	28%	5.0E-03	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	6.3E-08	<1%	6.6E-09	<1%	2.3E-04	<1%	8.3E-05	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	3.9E-06	16%	4.0E-07	16%	2.5E-02	51%	9.0E-03	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	1.7E-03	03%	6.2E-04	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	2.8E-03	06%	9.9E-04	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	5.8E-03	12%	2.1E-03	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-05	98%	3E-06	98%	5E-02	100%	2E-02	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.22
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - DERMAL EXPOSURE TO SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	Adult Resident CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 2.72E-05
CT CIF = 9.78E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 7.95E-05
CT NIF = 9.78E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.00E-02	4.6E-08	<1%	1.7E-09	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.00E-02	3.5E-06	07%	1.3E-07	07%	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.00E-02	3.2E-05	66%	1.2E-06	66%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.00E-02	5.3E-06	11%	1.9E-07	11%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.00E-02	1.9E-07	<1%	6.8E-09	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.00E-02	4.0E-08	<1%	1.4E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.00E-02	5.0E-06	10%	1.8E-07	10%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.00E-02	1.7E-06	04%	6.2E-08	04%	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
					--	--	--	--	--	--	--	--
Pesticides/PCBs												
Aroclor-1254	4.11E-01	2.22E+00	1.80E-05	1.00E-02	2.5E-07	<1%	8.9E-09	<1%	1.8E-02	24%	2.2E-03	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.00E-02	1.5E-07	<1%	5.3E-09	<1%	5.4E-04	<1%	6.6E-05	<1%
Metals												
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.00E-03	5.6E-07	01%	2.0E-08	01%	3.6E-03	05%	4.5E-04	05%
Barium	1.77E+02	--	3.50E-03	1.00E-03	--	--	--	--	4.0E-03	05%	4.9E-04	05%
Cadmium	2.03E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.6E-02	21%	2.0E-03	21%
Chromium	4.23E+01	--	1.00E-04	1.00E-03	--	--	--	--	3.4E-02	44%	4.1E-03	44%
Lead	1.57E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	**5.E-05**	**99%**	**2.E-06**	**99%**	**8.E-02**	**99%**	**9.E-03**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.1.23
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 9.36E-02
CT CIF = 1.95E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 2.73E-01
CT NIF = 1.95E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	3.5E-10	<1%	7.3E-11	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	3.2E-09	01%	6.6E-10	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	5.3E-10	<1%	1.1E-10	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	1.9E-11	<1%	3.9E-12	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	3.9E-12	<1%	8.2E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	4.9E-10	<1%	1.0E-10	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	1.7E-10	<1%	3.6E-11	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	1.00E-04	--	1.8E-11	<1%	3.8E-12	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	3.5E-11	<1%	7.2E-12	<1%	--	--	--	--
Metals											
Arsenic	1.10E+01	4.30E-03	--	2.1E-08	08%	4.4E-09	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	4.6E-04	100%	3.3E-04	100%
Cadmium	2.03E+00	1.80E-03	--	1.6E-09	<1%	3.4E-10	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	2.3E-07	89%	4.7E-08	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	3E-07	99%	5E-08	99%	5E-04	100%	3E-04	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF= 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.1.24
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - .05 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 9.36E-02
CT CIF = 1.95E-02

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 2.73E-01
CT NIF = 1.95E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
No volatiles in the media.												
PATHWAY SUMS:					NC		NC		NC		NC	

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.25
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - INGESTION OF SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Resident RME(1)	CT(1)
Intake Rate (IR), mg/day	200	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 5.48E-07
CT CIF = 6.52E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 6.39E-06
CT NIF = 2.28E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	2.00E-02	--	4.7E-08	<1%	5.5E-09	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	7.30E-01	--	3.6E-06	06%	4.2E-07	06%	--	--	--	--
Benzo(a)pyrene	8.09E+00	7.30E+00	--	3.2E-05	56%	3.9E-06	56%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	7.30E-01	--	5.4E-06	09%	6.4E-07	09%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	7.30E-02	--	1.9E-07	<1%	2.3E-08	<1%	--	--	--	--
Chrysene	9.98E+00	7.30E-03	--	4.0E-08	<1%	4.8E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	7.30E+00	--	5.0E-06	09%	6.0E-07	09%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	7.30E-01	--	1.7E-06	03%	2.1E-07	03%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	2.00E+00	2.00E-05	4.5E-07	<1%	5.4E-08	<1%	1.3E-01	28%	4.7E-02	28%
Dieldrin	1.69E-02	1.60E+01	5.00E-05	1.5E-07	<1%	1.8E-08	<1%	2.2E-03	<1%	7.7E-04	<1%
Metals											
Arsenic	1.10E+01	1.50E+00	3.00E-04	9.0E-06	16%	1.1E-06	16%	2.3E-01	51%	8.4E-02	51%
Barium	1.77E+02	--	7.00E-02	--	--	--	--	1.6E-02	03%	5.8E-03	03%
Cadmium	2.03E+00	--	5.00E-04	--	--	--	--	2.6E-02	06%	9.3E-03	06%
Chromium	4.23E+01	--	5.00E-03	--	--	--	--	5.4E-02	12%	1.9E-02	12%
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	6E-05	98%	7E-06	98%	5E-01	100%	2E-01	100%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.1.26
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - DERMAL EXPOSURE TO SOIL (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Resident RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	2300	1980
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 1.26E-05
CT CIF = 5.17E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 1.47E-04
CT NIF = 1.81E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles												
Carbazole	4.25E+00	4.00E-02	--	1.00E-02	2.1E-08	<1%	8.8E-10	<1%	--	--	--	--
Dibenzofuran	6.18E+00	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
Benzo(a)anthracene	8.92E+00	1.46E+00	--	1.00E-02	1.6E-06	07%	6.7E-08	07%	--	--	--	--
Benzo(a)pyrene	8.09E+00	1.46E+01	--	1.00E-02	1.5E-05	66%	6.1E-07	66%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	1.46E+00	--	1.00E-02	2.5E-06	11%	1.0E-07	11%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	1.46E-01	--	1.00E-02	8.7E-08	<1%	3.6E-09	<1%	--	--	--	--
Chrysene	9.98E+00	1.46E-02	--	1.00E-02	1.8E-08	<1%	7.5E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	1.46E+01	--	1.00E-02	2.3E-06	10%	9.4E-08	10%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	1.46E+00	--	1.00E-02	8.0E-07	04%	3.3E-08	04%	--	--	--	--
Phenanthrene	1.39E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pesticides/PCBs												
Aroclor-1254	4.11E-01	2.22E+00	1.80E-05	1.00E-02	1.2E-07	<1%	4.7E-09	<1%	3.4E-02	24%	4.1E-03	24%
Dieldrin	1.69E-02	3.20E+01	2.50E-05	1.00E-02	6.8E-08	<1%	2.8E-09	<1%	9.9E-04	<1%	1.2E-04	<1%
Metals												
Arsenic	1.10E+01	1.88E+00	2.40E-04	1.00E-03	2.6E-07	01%	1.1E-08	01%	6.7E-03	05%	8.3E-04	05%
Barium	1.77E+02	--	3.50E-03	1.00E-03	--	--	--	--	7.4E-03	05%	9.1E-04	05%
Cadmium	2.03E+00	--	1.00E-05	1.00E-03	--	--	--	--	3.0E-02	21%	3.7E-03	21%
Chromium	4.23E+01	--	1.00E-04	1.00E-03	--	--	--	--	6.2E-02	44%	7.6E-03	44%
Lead	1.57E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	2.E-05	99%	9.E-07	99%	1.E-01	99%	2.E-02	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.1.27
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 8.22E-02
CT CIF = 1.96E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.59E-01
CT NIF = 6.85E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Semivolatiles											
Carbazole	4.25E+00	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.18E+00	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
Benzo(a)anthracene	8.92E+00	8.80E-05	--	3.1E-10	<1%	7.3E-11	<1%	--	--	--	--
Benzo(a)pyrene	8.09E+00	8.80E-04	--	2.8E-09	01%	6.6E-10	01%	--	--	--	--
Benzo(b)fluoranthene	1.34E+01	8.80E-05	--	4.6E-10	<1%	1.1E-10	<1%	--	--	--	--
Benzo(k)fluoranthene	4.73E+00	8.80E-06	--	1.6E-11	<1%	3.9E-12	<1%	--	--	--	--
Chrysene	9.98E+00	8.80E-07	--	3.4E-12	<1%	8.2E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.25E+00	8.80E-04	--	4.3E-10	<1%	1.0E-10	<1%	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+00	8.80E-05	--	1.5E-10	<1%	3.6E-11	<1%	--	--	--	--
Phenanthrene	1.39E+01	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.11E-01	1.00E-04	--	1.6E-11	<1%	3.8E-12	<1%	--	--	--	--
Dieldrin	1.69E-02	4.60E-03	--	3.0E-11	<1%	7.3E-12	<1%	--	--	--	--
Metals											
Arsenic	1.10E+01	4.30E-03	--	1.9E-08	08%	4.4E-09	08%	--	--	--	--
Barium	1.77E+02	--	5.00E-04	--	--	--	--	1.6E-03	100%	1.2E-03	100%
Cadmium	2.03E+00	1.80E-03	--	1.4E-09	<1%	3.4E-10	<1%	--	--	--	--
Chromium	4.23E+01	1.20E-02	--	2.0E-07	89%	4.7E-08	89%	--	--	--	--
Lead	1.57E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-07	99%	5E-08	99%	2E-03	100%	1E-03	100%

PEF = 7.33E+08

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.1.28
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - INHALATION OF VOLATILE SOIL CONTAMINANTS(0 - 0.5 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 8.22E-02
CT CIF = 1.96E-02

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.59E-01
CT NIF = 6.85E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR ($m^3/\mu g$)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
No volatiles in the media.												
				PATHWAY SUMS:	NC		NC		NC		NC	

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.1.29
CALCULATION OF SOIL PARTICULATE EMISSION FACTOR[1]

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

CONSTANTS:							
Inverse of mean conc at center of square source (Q/C)	50.60	g/m^2-s per kg/m^3	(2,3)	Particulate emission factor (PEF) =	7.33E+08	$meters^3/kg$	
Fraction of vegetative cover (V) =	0.50	unitless	(2)				
Mean annual wind speed (Um) =	4.69	meters/sec	(2)	Q/C x (3600s/h/(0.036 x (1-V) x (Um/Ut)^3 x F(x))			
Equivalent threshold value of wind speed at 7 m (Ut) =	11.32	meters/sec	(2)				
Function dependent on Um/Ut from Cowherd (1985)	0.194	unitless	(2)				

Notes:
1. USEPA 1996f: Soil Screening Guidance
2. Use site-specific or default values from USEPA 1996c.
3. Default values for a site in Chicago as follows:
   30 acres - 50.60

PEF for 30-acre site = 7.33E+08

TABLE C.1.30
CALCULATION OF SOIL VOLATILITZATION FACTOR[1]

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Constituent	Koc[4] (cm^3/g)	H[4] (atm-m3/mol)	H[4] dimensionless	Dw[4] (cm^2/s)	Di[4] (cm2/sec)	Kd[4] (cm^3/g)	Da[4] (cm2/s)	Volatilization Factor (m^3/kg)
Benzene	5.89E+01	5.55E-03	2.28E-01	9.80E-06	8.80E-02	5.89E-01	1.42E-03	2.45E+03

CONSTANTS:	Inverse of the mean conc at the center of a square source (Q/C), g/m2-s per kg/m3 =	50.60	Default for 30-acre site in Chicago
	Exposure interval (T), s =	9.50E+08	(5)
	Bulk densitey (p_b), g/cm^3 =	1.50	(5)
	Air -filled soil porosity (0a), Lair/Lsoil =	0.28	(5)
	Total soil porosity (n), Lpore/Lsoil =	4.30E-01	(5)
	Water-filled soil porosity (0w), Lwater/Lsoil =	0.150	(5)
	Soil particle density (p_s), g/cm^3 =	2.650	(5)
	Conversion factor (CF), m^2/cm^2 =	1E-04	(5)
INPUT VARIABLES:	Organic carbon partition coef. (Koc), cm^3/g =	chem-spec	
	Henry's Law constant (H), atm-m^3/mol =	chem-spec	
	Diffusivity in water (Dw), cm2/s =	chem-spec	
	Gas diffusivity (Di), cm^2/sec =	chem-spec	
	Organic carbon content (foc), g/g =	0.010	site-specific
INTERMEDIATE STEPS:	Soil-water partition coefficient (Kd), cm^3/g =	chem-spec	(Koc × foc)
	Apparent diffusivity (Da), cm^2/s =	chem-spec	$[(0a^{10/3} * Di * H' + 0w^{10/3} * Dw)/n^2)/(p_b * Kd + 0w + 0a * H'))]$
OUTPUT:	Volatilization Factor (VF), m^3/kg =	chem-spec	Q/C x ((3.14 x Da x T)^0.5/(2 x p_b x Da)) x 10^{-4} (m^2/cm^2)

Notes:
1. USEPA, 1996: Soil Screening Guidance
2 Chemical Abstract Service.
3. Chemical class: v -- volatile; s -- semivolatile; p -- pesticide/pcb; x -- dioxin; and m -- metal.
4. Chemical specific factors from Soil Screening Guidance, if available.
5. Default values from USEPA, 1996.

APPENDIX C.2

RISK CALCULATION TABLES
(0 - 10 FEET)

TABLE C.2.1
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	Industrial Worker CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 1.75E-07
CT CIF = 1.64E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 4.89E-07
CT NIF = 2.29E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	1.0E-08	<1%	9.5E-10	<1%	3.3E-04	<1%	1.5E-04	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	5.7E-08	<1%	5.3E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	1.3E-03	03%	6.3E-04	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	6.8E-04	01%	3.2E-04	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	1.6E-04	<1%	7.4E-05	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	1.7E-05	08%	1.6E-06	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	1.5E-04	71%	1.4E-05	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	1.6E-05	08%	1.5E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	8.1E-07	<1%	7.6E-08	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	1.9E-07	<1%	1.8E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	1.8E-05	09%	1.7E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	3.8E-03	08%	1.8E-03	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	8.1E-04	02%	3.8E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	6.3E-06	03%	5.9E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	1.9E-03	04%	9.1E-04	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	4.1E-03	08%	1.9E-03	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	1.5E-07	<1%	1.4E-08	<1%	1.1E-02	21%	5.0E-03	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	5.3E-08	<1%	4.9E-09	<1%	1.8E-04	<1%	8.6E-05	<1%
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	3.0E-06	01%	2.8E-07	01%	1.9E-02	38%	8.8E-03	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	7.8E-04	02%	3.7E-04	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	2.3E-03	05%	1.1E-03	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	3.9E-03	08%	1.8E-03	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**2E-04**	**99%**	**2E-05**	**99%**	**5E-02**	**99%**	**2E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989)
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.2
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 2.03E-05
CT CIF = 6.5418E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 5.68E-05
CT NIF = 9.1585E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	1.2E-08	<1%	4.0E-10	<1%	4.0E-04	<1%	6.5E-05	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	1.3E-07	<1%	4.2E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	3.1E-03	04%	5.0E-04	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	1.6E-03	02%	2.6E-04	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	3.7E-04	<1%	5.9E-05	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	3.8E-05	08%	1.2E-06	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	3.4E-04	72%	1.1E-05	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	3.7E-05	08%	1.2E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	1.9E-06	<1%	6.1E-08	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	4.4E-07	<1%	1.4E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	4.2E-05	09%	1.3E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	8.9E-03	10%	1.4E-03	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	1.9E-03	02%	3.0E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	1.5E-05	03%	4.7E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	4.5E-03	05%	7.3E-04	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	9.5E-03	11%	1.5E-03	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	2.0E-07	<1%	6.3E-09	<1%	1.4E-02	16%	2.2E-03	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	1.2E-07	<1%	3.9E-09	<1%	4.3E-04	<1%	6.9E-05	<1%
Metals												
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	4.4E-07	<1%	1.4E-08	<1%	2.7E-03	03%	4.4E-04	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	1.8E-03	02%	2.9E-04	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.3E-02	16%	2.1E-03	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	2.3E-02	27%	3.7E-03	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	**5.E-04**	**99%**	**2.E-05**	**99%**	**8.E-02**	**99%**	**1.E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.3
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.49E-02
CT CIF = 6.54E-03

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	2.8E-12	<1%	5.2E-13	<1%	1.6E-07	<1%	1.5E-07	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	1.9E-09	02%	3.6E-10	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	1.7E-08	15%	3.2E-09	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	1.8E-09	02%	3.5E-10	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	9.3E-11	<1%	1.7E-11	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	2.2E-11	<1%	4.1E-12	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	2.1E-09	02%	3.9E-10	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	7.3E-10	<1%	1.4E-10	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	7.3E-12	<1%	1.4E-12	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	1.4E-11	<1%	2.7E-12	<1%	--	--	--	--
Metals											
Arsenic	1.15E+01	4.30E-03	--	8.2E-09	07%	1.5E-09	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	1.0E-04	100%	9.8E-05	100%
Cadmium	2.34E+00	1.80E-03	--	7.0E-10	<1%	1.3E-10	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	8.0E-08	71%	1.5E-08	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**1E-07**	**99%**	**2E-08**	**99%**	**1E-04**	**100%**	**1E-04**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

PEF = 7.33E+08

TABLE C.2.4
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - INHALATION OF VOLATILE SOIL CONTAMINANTS(0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: [4]	Industrial Worker RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	9,125	1,825

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.49E-02
CT CIF = 6.54E-03

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc[6] (mg/kg)	Toxicity Values[7] IUR ($m^3/\mu g$)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	8.3E-07	100%	1.6E-07	100%	4.7E-02	100%	4.4E-02	100%
				PATHWAY SUMS:	**8E-07**	**100%**	**2E-07**	**100%**	**5E-02**	**100%**	**4E-02**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-μg-day/mg-m^3) / (Volatilization Factor, m^3/kg). Includes conversion from IUR to inhalation slope factor = 3500 kg-μg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.5
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	Construction Worker CT(1)
Intake Rate (IR), mg/day	480	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 3.35E-08
CT CIF = 6.54E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 2.35E-06
CT NIF = 4.58E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) OSF (kg-d/mg)	Toxicity Values (7) ORfD (mg/kg-d)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	2.0E-09	<1%	3.8E-10	<1%	1.6E-03	<1%	3.1E-04	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	1.1E-08	<1%	2.1E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	6.5E-03	03%	1.3E-03	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	3.3E-03	01%	6.4E-04	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	7.6E-04	<1%	1.5E-04	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	3.2E-06	08%	6.2E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	2.8E-05	71%	5.5E-06	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	3.1E-06	08%	6.0E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	1.6E-07	<1%	3.0E-08	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	3.6E-08	<1%	7.1E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	3.5E-06	09%	6.7E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	1.8E-02	08%	3.6E-03	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	3.9E-03	02%	7.6E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	1.2E-06	03%	2.4E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	9.3E-03	04%	1.8E-03	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	2.0E-02	08%	3.8E-03	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	2.9E-08	<1%	5.7E-09	<1%	5.1E-02	21%	1.0E-02	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	1.0E-08	<1%	2.0E-09	<1%	8.8E-04	<1%	1.7E-04	<1%
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	5.8E-07	01%	1.1E-07	01%	9.0E-02	38%	1.8E-02	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	3.8E-03	02%	7.3E-04	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	1.1E-02	05%	2.1E-03	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	1.9E-02	08%	3.7E-03	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**4E-05**	**99%**	**8E-06**	**99%**	**2E-01**	**99%**	**5E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.6
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	Construction Worker CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 8.11E-07
CT CIF = 1.30836E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 5.68E-05
CT NIF = 9.15851E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	5.0E-10	<1%	8.0E-11	<1%	4.0E-04	<1%	6.5E-05	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	5.3E-09	<1%	8.5E-10	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	3.1E-03	04%	5.0E-04	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	1.6E-03	02%	2.6E-04	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	3.7E-04	<1%	5.9E-05	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	1.5E-06	08%	2.5E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	1.4E-05	72%	2.2E-06	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	1.5E-06	08%	2.4E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	7.5E-08	<1%	1.2E-08	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	1.8E-08	<1%	2.8E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	1.7E-06	09%	2.7E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	8.9E-03	10%	1.4E-03	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	1.9E-03	02%	3.0E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	5.9E-07	03%	9.5E-08	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	4.5E-03	05%	7.3E-04	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	9.5E-03	11%	1.5E-03	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	7.9E-09	<1%	1.3E-09	<1%	1.4E-02	16%	2.2E-03	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	4.9E-09	<1%	7.9E-10	<1%	4.3E-04	<1%	6.9E-05	<1%
Metals							--	--				
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	1.7E-08	<1%	2.8E-09	<1%	2.7E-03	03%	4.4E-04	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	1.8E-03	02%	2.9E-04	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.3E-02	16%	2.1E-03	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	2.3E-02	27%	3.7E-03	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	**2.E-05**	**99%**	**3.E-06**	**99%**	**8.E-02**	**99%**	**1.E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.7
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	Construction Worker CT(1)	INTAKE FACTOR CALCULATIONS (5)
			Carcinogenic Intake Factor (CIF), m^3/kg-day =
Inhalation Rate (IR), m^3/hr	1.25	1.25	(IR *ET * EF * ED) / (BW * ATC)
Exposure Time (ET), hrs/day	8	8	RME CIF = 1.40E-03
Exposure Frequency (EF), days/yr	250	234	CT CIF = 1.31E-03
Exposure Duration (ED), yrs	1	1	Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
Body Weight (BW), kg	70	70	(IR * ET * EF * ED) / (BW * ATN)
Avging Time, Carc(2) (ATC), days	25,550	25,550	RME NIF = 9.78E-02
Avging Time, Noncarc(3) (ATN), days	365	365	CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

		Toxicity Values (7)		Cancer Risk (8)				Hazard Quotient (9)			
Constituent	EP Conc(6) (mg/kg)	IUR (m^3/µg)	RfC (mg/m^3)	RME	% of Total	CT	% of Total	RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	1.1E-13	<1%	1.0E-13	<1%	1.6E-07	<1%	1.5E-07	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	7.6E-11	02%	7.1E-11	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	6.8E-10	15%	6.4E-10	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	7.4E-11	02%	6.9E-11	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	3.7E-12	<1%	3.5E-12	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	8.7E-13	<1%	8.2E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	8.3E-11	02%	7.7E-11	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	2.9E-11	<1%	2.7E-11	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	2.9E-13	<1%	2.7E-13	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	5.8E-13	<1%	5.4E-13	<1%	--	--	--	--
Metals						--	--				
Arsenic	1.15E+01	4.30E-03	--	3.3E-10	07%	3.1E-10	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	1.0E-04	100%	9.8E-05	100%
Cadmium	2.34E+00	1.80E-03	--	2.8E-11	<1%	2.6E-11	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	3.2E-09	71%	3.0E-09	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	5E-09	99%	4E-09	99%	1E-04	100%	1E-04	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg- 7.33E+08
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.2.8
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: [4]	Construction Worker RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	365	365

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc[6] (mg/kg)	Toxicity Values[7] IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	3.3E-08	100%	3.1E-08	100%	4.7E-02	100%	4.4E-02	100%
				PATHWAY SUMS:	**3E-08**	**100%**	**3E-08**	**100%**	**5E-02**	**100%**	**4E-02**	**100%**

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.9
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME(1)	Adult Recreator CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 6.71E-08
CT CIF = 4.89E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.96E-07
CT NIF = 4.89E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	Toxicity Values(7) ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	Cancer Risk(8) CT	% of Total	Hazard Quotient(9) RME	% of Total	Hazard Quotient(9) CT	% of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	3.9E-09	<1%	2.9E-10	<1%	1.3E-04	<1%	3.3E-05	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	2.2E-08	<1%	1.6E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	5.4E-04	03%	1.3E-04	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	2.7E-04	01%	6.8E-05	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	6.3E-05	<1%	1.6E-05	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	6.4E-06	08%	4.6E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	5.7E-05	71%	4.1E-06	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	6.2E-06	08%	4.5E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	3.1E-07	<1%	2.3E-08	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	7.3E-08	<1%	5.3E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	6.9E-06	09%	5.0E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	1.5E-03	08%	3.8E-04	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	3.2E-04	02%	8.1E-05	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	2.4E-06	03%	1.8E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	7.8E-04	04%	1.9E-04	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	1.6E-03	08%	4.1E-04	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	5.9E-08	<1%	4.3E-09	<1%	4.3E-03	21%	1.1E-03	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	2.0E-08	<1%	1.5E-09	<1%	7.4E-05	<1%	1.8E-05	<1%
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	1.2E-06	01%	8.4E-08	01%	7.5E-03	38%	1.9E-03	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	3.1E-04	02%	7.8E-05	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	9.2E-04	05%	2.3E-04	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	1.6E-03	08%	3.9E-04	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	8E-05	99%	6E-06	99%	2E-02	99%	5E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.10
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 7.78E-06
CT CIF = 1.96E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 2.27E-05
CT NIF = 1.96E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	4.8E-09	<1%	1.2E-10	<1%	1.6E-04	<1%	1.4E-05	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	5.0E-08	<1%	1.3E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	1.2E-03	04%	1.1E-04	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	6.3E-04	02%	5.5E-05	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	1.5E-04	<1%	1.3E-05	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	1.5E-05	08%	3.7E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	1.3E-04	72%	3.3E-06	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	1.4E-05	08%	3.6E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	7.2E-07	<1%	1.8E-08	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	1.7E-07	<1%	4.3E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	1.6E-05	09%	4.0E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	3.6E-03	10%	3.1E-04	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	7.5E-04	02%	6.5E-05	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	5.6E-06	03%	1.4E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	1.8E-03	05%	1.6E-04	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	3.8E-03	11%	3.3E-04	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	7.5E-08	<1%	1.9E-09	<1%	5.5E-03	16%	4.7E-04	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	4.7E-08	<1%	1.2E-09	<1%	1.7E-04	<1%	1.5E-05	<1%
Metals											--	--
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	1.7E-07	<1%	4.2E-09	<1%	1.1E-03	03%	9.4E-05	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	7.3E-04	02%	6.3E-05	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	5.3E-03	16%	4.6E-04	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	9.1E-03	27%	7.8E-04	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	2.E-04	99%	5.E-06	99%	3.E-02	99%	3.E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.11
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 4.46E-03
CT CIF = 3.25E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.30E-02
CT NIF = 3.25E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	3.5E-13	<1%	2.6E-14	<1%	2.1E-08	<1%	5.2E-09	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	2.4E-10	02%	1.8E-11	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	2.2E-09	15%	1.6E-10	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	2.4E-10	02%	1.7E-11	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	1.2E-11	<1%	8.6E-13	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	2.8E-12	<1%	2.0E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	2.6E-10	02%	1.9E-11	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	9.3E-11	<1%	6.8E-12	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	9.3E-13	<1%	6.8E-14	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	1.8E-12	<1%	1.3E-13	<1%	--	--	--	--
Metals											
Arsenic	1.15E+01	4.30E-03	--	1.1E-09	07%	7.7E-11	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	1.4E-05	100%	3.5E-06	100%
Cadmium	2.34E+00	1.80E-03	--	9.0E-11	<1%	6.5E-12	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	1.0E-08	71%	7.5E-10	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**1E-08**	**99%**	**1E-09**	**99%**	**1E-05**	**100%**	**3E-06**	**100%**

Notes:
1. RME = Reasonable *maximum exposure. CT = Central Tendency.*
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per

PEF = 7.33E+08

4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.2.12
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Recreator RME (1)	Adult Recreator CT (1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 4.46E-03
CT CIF = 3.25E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.30E-02
CT NIF = 3.25E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR ($m^3/\mu g$)	Toxicity Values(7) RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	Cancer Risk % of Total	Cancer Risk CT	Cancer Risk % of Total	Hazard Quotient(9) RME	Hazard Quotient % of Total	Hazard Quotient CT	Hazard Quotient % of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	1.1E-07	100%	7.8E-09	100%	6.2E-03	100%	1.6E-03	100%
				PATHWAY SUMS:	**1E-07**	**100%**	**8E-09**	**100%**	**6E-03**	**100%**	**2E-03**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.13
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - INGESTION OF SOIL(0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	CT(1)
Intake Rate (IR), mg/day	200	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 1.57E-07
CT CIF = 1.30E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.83E-06
CT NIF = 4.57E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	9.1E-09	<1%	7.6E-10	<1%	1.2E-03	<1%	3.1E-04	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	5.1E-08	<1%	4.2E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	5.0E-03	03%	1.3E-03	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	2.5E-03	01%	6.4E-04	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	5.9E-04	<1%	1.5E-04	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	1.5E-05	08%	1.2E-06	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	1.3E-04	71%	1.1E-05	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	1.4E-05	08%	1.2E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	7.2E-07	<1%	6.0E-08	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	1.7E-07	<1%	1.4E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	1.6E-05	09%	1.3E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	1.4E-02	08%	3.6E-03	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	3.0E-03	02%	7.5E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	5.7E-06	03%	4.7E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	7.3E-03	04%	1.8E-03	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	1.5E-02	08%	3.8E-03	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	1.4E-07	<1%	1.1E-08	<1%	4.0E-02	21%	1.0E-02	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	4.7E-08	<1%	3.9E-09	<1%	6.9E-04	<1%	1.7E-04	<1%
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	2.7E-06	01%	2.3E-07	01%	7.0E-02	38%	1.8E-02	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	2.9E-03	02%	7.3E-04	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	8.5E-03	05%	2.1E-03	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	1.5E-02	08%	3.7E-03	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-04	99%	2E-05	99%	2E-01	99%	5E-02	99%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.14
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	Child Recreator CT(1)
Skin Surface Area (SA), cm^2/event	2300	1980
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 3.60E-06
CT CIF = 1.03E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 4.20E-05
CT NIF = 3.62E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	Toxicity Values(7) DRfD (mg/kg-d)	Toxicity Values(7) DABS (unitless)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	2.2E-09	<1%	6.3E-11	<1%	3.0E-04	<1%	2.6E-05	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	2.3E-08	<1%	6.7E-10	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	2.3E-03	04%	2.0E-04	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	1.2E-03	02%	1.0E-04	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	2.7E-04	<1%	2.3E-05	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	6.8E-06	08%	2.0E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	6.1E-05	72%	1.7E-06	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	6.6E-06	08%	1.9E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	3.3E-07	<1%	9.6E-09	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	7.8E-08	<1%	2.2E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	7.4E-06	09%	2.1E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	6.6E-03	10%	5.7E-04	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	1.4E-03	02%	1.2E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	2.6E-06	03%	7.5E-08	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	3.3E-03	05%	2.9E-04	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	7.0E-03	11%	6.0E-04	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	3.5E-08	<1%	1.0E-09	<1%	1.0E-02	16%	8.8E-04	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	2.2E-08	<1%	6.2E-10	<1%	3.2E-04	<1%	2.7E-05	<1%
Metals												
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	7.8E-08	<1%	2.2E-09	<1%	2.0E-03	03%	1.7E-04	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	1.3E-03	02%	1.2E-04	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	9.8E-03	16%	8.5E-04	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	1.7E-02	27%	1.5E-03	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	9.E-05	99%	2.E-06	99%	6.E-02	99%	5.E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.15
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR *ET * EF * ED) / (BW * ATC)
RME CIF = 3.91E-03
CT CIF = 3.26E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 4.57E-02
CT NIF = 1.14E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR ($m^3/\mu g$)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	3.1E-13	<1%	2.6E-14	<1%	7.3E-08	<1%	1.8E-08	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	2.1E-10	02%	1.8E-11	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	1.9E-09	15%	1.6E-10	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	2.1E-10	02%	1.7E-11	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	1.0E-11	<1%	8.7E-13	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	2.4E-12	<1%	2.0E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	2.3E-10	02%	1.9E-11	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	8.1E-11	<1%	6.8E-12	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	8.1E-13	<1%	6.8E-14	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	1.6E-12	<1%	1.3E-13	<1%	--	--	--	--
				--	--	--	--	--	--	--	--
Metals				--	--	--	--	--	--	--	--
Arsenic	1.15E+01	4.30E-03	--	9.2E-10	07%	7.7E-11	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	4.9E-05	100%	1.2E-05	100%
Cadmium	2.34E+00	1.80E-03	--	7.9E-11	<1%	6.6E-12	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	9.0E-09	71%	7.5E-10	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**1E-08**	**99%**	**1E-09**	**99%**	**5E-05**	**100%**	**1E-05**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per yea   PEF = 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-μg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-μg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.2.16
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Recreator RME(1)	Child Recreator CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
ME CIF = 3.91E-03
CT CIF = 3.26E-04
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
ME NIF = 4.57E-02
CT NIF = 1.14E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	Toxicity Values (7) RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	9.3E-08	100%	7.8E-09	100%	2.2E-02	100%	5.5E-03	100%
				PATHWAY SUMS:	**9E-08**	**100%**	**8E-09**	**100%**	**2E-02**	**100%**	**5E-03**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.17
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 2.35E-07
CT CIF = 2.45E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 6.85E-07
CT NIF = 2.45E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

		Toxicity Values (7)		Cancer Risk(8)				Hazard Quotient(9)			
Constituent	EP Conc(6) (mg/kg)	OSF (kg-d/mg)	ORfD (mg/kg-d)	RME	% of Total	CT	% of Total	RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	1.4E-08	<1%	1.4E-09	<1%	4.6E-04	<1%	1.6E-04	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	7.6E-08	<1%	7.9E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	1.9E-03	03%	6.7E-04	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	9.5E-04	01%	3.4E-04	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	2.2E-04	<1%	7.9E-05	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	2.2E-05	08%	2.3E-06	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	2.0E-04	71%	2.1E-05	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	2.2E-05	08%	2.3E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	1.1E-06	<1%	1.1E-07	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	2.6E-07	<1%	2.7E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	2.4E-05	09%	2.5E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	5.4E-03	08%	1.9E-03	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	1.1E-03	02%	4.0E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	8.5E-06	03%	8.8E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	2.7E-03	04%	9.7E-04	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	5.7E-03	08%	2.0E-03	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	2.0E-07	<1%	2.1E-08	<1%	1.5E-02	21%	5.3E-03	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	7.1E-08	<1%	7.4E-09	<1%	2.6E-04	<1%	9.2E-05	<1%
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	4.1E-06	01%	4.2E-07	01%	2.6E-02	38%	9.4E-03	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	1.1E-03	02%	3.9E-04	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	3.2E-03	05%	1.1E-03	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	5.5E-03	08%	2.0E-03	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	3E-04	99%	3E-05	99%	7E-02	99%	2E-02	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.18
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 2.72E-05
CT CIF = 9.78E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 7.95E-05
CT NIF = 9.78E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	1.7E-08	<1%	6.0E-10	<1%	5.6E-04	<1%	6.9E-05	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	1.8E-07	<1%	6.3E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	4.4E-03	04%	5.4E-04	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	2.2E-03	02%	2.7E-04	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	5.1E-04	<1%	6.3E-05	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	5.2E-05	08%	1.9E-06	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	4.6E-04	72%	1.7E-05	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	5.0E-05	08%	1.8E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	2.5E-06	<1%	9.1E-08	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	5.9E-07	<1%	2.1E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	5.6E-05	09%	2.0E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	1.2E-02	10%	1.5E-03	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	2.6E-03	02%	3.2E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	2.0E-05	03%	7.1E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	6.3E-03	05%	7.8E-04	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	1.3E-02	11%	1.6E-03	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	2.6E-07	<1%	9.5E-09	<1%	1.9E-02	16%	2.4E-03	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	1.6E-07	<1%	5.9E-09	<1%	6.0E-04	<1%	7.4E-05	<1%
Metals												
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	5.9E-07	<1%	2.1E-08	<1%	3.8E-03	03%	4.7E-04	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	2.5E-03	02%	3.1E-04	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.9E-02	16%	2.3E-03	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	3.2E-02	27%	3.9E-03	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	6.E-04	99%	2.E-05	99%	1.E-01	99%	1.E-02	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. *See exposure assumption table.*
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.19
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 9.36E-02
CT CIF = 1.95E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 2.73E-01
CT NIF = 1.95E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

		Toxicity Values (7)		Cancer Risk (8)				Hazard Quotient (9)			
Constituent	EP Conc(6) (mg/kg)	IUR (m^3/µg)	RfC (mg/m^3)	RME	% of Total	CT	% of Total	RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	7.4E-12	<1%	1.6E-12	<1%	4.4E-07	<1%	3.1E-07	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	5.1E-09	02%	1.1E-09	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	4.6E-08	15%	9.5E-09	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	4.9E-09	02%	1.0E-09	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	2.5E-10	<1%	5.2E-11	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	5.9E-11	<1%	1.2E-11	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	5.5E-09	02%	1.2E-09	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	1.9E-09	<1%	4.1E-10	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	1.9E-11	<1%	4.1E-12	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	3.9E-11	<1%	8.0E-12	<1%	--	--	--	--
Metals											
Arsenic	1.15E+01	4.30E-03	--	2.2E-08	07%	4.6E-09	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	2.9E-04	100%	2.1E-04	100%
Cadmium	2.34E+00	1.80E-03	--	1.9E-09	<1%	3.9E-10	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	2.1E-07	71%	4.5E-08	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**3E-07**	**99%**	**6E-08**	**99%**	**3E-04**	**100%**	**2E-04**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF= 7.33E+08
4. *See exposure assumption table.*
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.2.20
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - *INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - 10 FEET)*

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Adult Resident RME(1)	Adult Resident CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 9.36E-02
CT CIF = 1.95E-02
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 2.73E-01
CT NIF = 1.95E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	2.2E-06	100%	4.7E-07	100%	1.3E-01	100%	9.3E-02	100%
				PATHWAY SUMS:	**2E-06**	**100%**	**5E-07**	**100%**	**1E-01**	**100%**	**9E-02**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; *calculated as exposure duration (in years) times 365 days per year.*
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.21
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: [4]	Child Resident RME[1]	CT[1]
Intake Rate (IR), mg/day	200	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS [5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 5.48E-07
CT CIF = 6.52E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 6.39E-06
CT NIF = 2.28E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc[6] (mg/kg)	Toxicity Values[7] OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	3.2E-08	<1%	3.8E-09	<1%	4.3E-03	<1%	1.5E-03	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	1.8E-07	<1%	2.1E-08	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	1.8E-02	03%	6.3E-03	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	8.9E-03	01%	3.2E-03	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	2.1E-03	<1%	7.3E-04	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	5.2E-05	08%	6.2E-06	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	4.6E-04	71%	5.5E-05	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	5.0E-05	08%	6.0E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	2.5E-06	<1%	3.0E-07	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	6.0E-07	<1%	7.1E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	5.6E-05	09%	6.7E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	5.0E-02	08%	1.8E-02	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	1.1E-02	02%	3.8E-03	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	2.0E-05	03%	2.4E-06	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	2.5E-02	04%	9.1E-03	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	5.3E-02	08%	1.9E-02	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	4.8E-07	<1%	5.7E-08	<1%	1.4E-01	21%	5.0E-02	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	1.6E-07	<1%	2.0E-08	<1%	2.4E-03	<1%	8.6E-04	<1%
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	9.5E-06	01%	1.1E-06	01%	2.5E-01	38%	8.8E-02	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	1.0E-02	02%	3.7E-03	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	3.0E-02	05%	1.1E-02	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	5.1E-02	08%	1.8E-02	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	7E-04	99%	8E-05	99%	7E-01	99%	2E-01	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.22
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Resident RME(1)	Child Resident CT(1)
Skin Surface Area (SA), cm^2/event	2300	1980
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 1.26E-05
CT CIF = 5.17E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 1.47E-04
CT NIF = 1.81E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	Toxicity Values(7) DRfD (mg/kg-d)	Toxicity Values(7) DABS (unitless)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	7.7E-09	<1%	3.2E-10	<1%	1.0E-03	<1%	1.3E-04	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	8.2E-08	<1%	3.3E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	8.1E-03	04%	9.9E-04	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	4.1E-03	02%	5.0E-04	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	9.5E-04	<1%	1.2E-04	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	2.4E-05	08%	9.8E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	2.1E-04	72%	8.7E-06	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	2.3E-05	08%	9.5E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	1.2E-06	<1%	4.8E-08	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	2.7E-07	<1%	1.1E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	2.6E-05	09%	1.1E-06	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	2.3E-02	10%	2.8E-03	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	4.9E-03	02%	6.0E-04	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	9.1E-06	03%	3.7E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	1.2E-02	05%	1.4E-03	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	2.5E-02	11%	3.0E-03	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	1.2E-07	<1%	5.0E-09	<1%	3.6E-02	16%	4.4E-03	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	7.6E-08	<1%	3.1E-09	<1%	1.1E-03	<1%	1.4E-04	<1%
Metals												
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	2.7E-07	<1%	1.1E-08	<1%	7.0E-03	03%	8.7E-04	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	4.7E-03	02%	5.8E-04	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	3.4E-02	16%	4.2E-03	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	5.9E-02	27%	7.3E-03	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	3.E-04	99%	1.E-05	99%	2.E-01	99%	3.E-02	99%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.23
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Child Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTACT FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 8.22E-02
CT CIF = 1.96E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.59E-01
CT NIF = 6.85E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	6.5E-12	<1%	1.6E-12	<1%	1.5E-06	<1%	1.1E-06	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	4.5E-09	02%	1.1E-09	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	4.0E-08	15%	9.5E-09	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	4.3E-09	02%	1.0E-09	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	2.2E-10	<1%	5.2E-11	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	5.1E-11	<1%	1.2E-11	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	4.9E-09	02%	1.2E-09	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	1.7E-09	<1%	4.1E-10	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	1.7E-11	<1%	4.1E-12	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	3.4E-11	<1%	8.1E-12	<1%	--	--	--	--
Metals											
Arsenic	1.15E+01	4.30E-03	--	1.9E-08	07%	4.6E-09	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	1.0E-03	100%	7.3E-04	100%
Cadmium	2.34E+00	1.80E-03	--	1.7E-09	<1%	3.9E-10	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	1.9E-07	71%	4.5E-08	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**3E-07**	**99%**	**6E-08**	**99%**	**1E-03**	**100%**	**7E-04**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

PEF = 7.33E+08

TABLE C.2.24
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - INHALATION OF VOLATILE SOIL CONTAMINANTS(0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: [4]	Child Resident RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 8.22E-02
CT CIF = 1.96E-02

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.59E-01
CT NIF = 6.85E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc[6] (mg/kg)	Toxicity Values [7] IUR ($m^3/\mu g$)	Toxicity Values [7] RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	2.0E-06	100%	4.7E-07	100%	4.6E-01	100%	3.3E-01	100%
				PATHWAY SUMS:	**2E-06**	**100%**	**5E-07**	**100%**	**5E-01**	**100%**	**3E-01**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.25
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	ADOLESCENT TRESPASSER RME(1)	ADOLESCENT TRESPASSER CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 2.17E-08
CT CIF = 5.44E-09
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.52E-07
CT NIF = 3.81E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	2.90E-02	3.00E-03	1.3E-09	<1%	3.2E-10	<1%	1.0E-04	<1%	2.5E-05	<1%
Semivolatiles											
Carbazole	1.62E+01	2.00E-02	--	7.0E-09	<1%	1.8E-09	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	4.00E-02	--	--	--	--	4.2E-04	03%	1.0E-04	03%
Acenaphthene	8.36E+01	--	6.00E-02	--	--	--	--	2.1E-04	01%	5.3E-05	01%
Anthracene	9.65E+01	--	3.00E-01	--	--	--	--	4.9E-05	<1%	1.2E-05	<1%
Benzo(a)anthracene	1.30E+02	7.30E-01	--	2.1E-06	08%	5.2E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	7.30E+00	--	1.8E-05	71%	4.6E-06	71%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	7.30E-01	--	2.0E-06	08%	5.0E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	7.30E-02	--	1.0E-07	<1%	2.5E-08	<1%	--	--	--	--
Chrysene	1.49E+02	7.30E-03	--	2.4E-08	<1%	5.9E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	7.30E+00	--	2.2E-06	09%	5.6E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	4.00E-02	--	--	--	--	1.2E-03	08%	3.0E-04	08%
Fluorene	6.61E+01	--	4.00E-02	--	--	--	--	2.5E-04	02%	6.3E-05	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	7.30E-01	--	7.9E-07	03%	2.0E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	4.00E-02	--	--	--	--	6.1E-04	04%	1.5E-04	04%
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	3.00E-02	--	--	--	--	1.3E-03	08%	3.2E-04	08%
Pesticides/PCBs											
Aroclor-1254	4.36E-01	2.00E+00	2.00E-05	1.9E-08	<1%	4.7E-09	<1%	3.3E-03	21%	8.3E-04	21%
Dieldrin	1.88E-02	1.60E+01	5.00E-05	6.5E-09	<1%	1.6E-09	<1%	5.7E-05	<1%	1.4E-05	<1%
				--	--	--	--	--	--	--	--
Metals											
Arsenic	1.15E+01	1.50E+00	3.00E-04	3.8E-07	01%	9.4E-08	01%	5.8E-03	38%	1.5E-03	38%
Barium	1.12E+02	--	7.00E-02	--	--	--	--	2.4E-04	02%	6.1E-05	02%
Cadmium	2.34E+00	--	5.00E-04	--	--	--	--	7.1E-04	05%	1.8E-04	05%
Chromium	4.01E+01	--	5.00E-03	--	--	--	--	1.2E-03	08%	3.1E-04	08%
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**3E-05**	**99%**	**7E-06**	**99%**	**2E-02**	**99%**	**4E-03**	**99%**

Notes:
1. *RME = Reasonable maximum exposure. CT = Central Tendency.*
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.26
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	ADOLESCENT TRESPASSER RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	4400	3350
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 1.91E-06
CT CIF = 1.46E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 1.34E-05
CT NIF = 1.02E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	3.05E-02	2.85E-03	1.00E-02	1.2E-09	<1%	8.9E-11	<1%	9.4E-05	<1%	7.2E-06	<1%
Semivolatiles												
Carbazole	1.62E+01	4.00E-02	--	1.00E-02	1.2E-08	<1%	9.4E-10	<1%	--	--	--	--
Dibenzofuran	1.35E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.10E+02	--	2.00E-02	1.00E-02	--	--	--	--	7.4E-04	04%	5.6E-05	04%
Acenaphthene	8.36E+01	--	3.00E-02	1.00E-02	--	--	--	--	3.7E-04	02%	2.8E-05	02%
Anthracene	9.65E+01	--	1.50E-01	1.00E-02	--	--	--	--	8.6E-05	<1%	6.6E-06	<1%
Benzo(a)anthracene	1.30E+02	1.46E+00	--	1.00E-02	3.6E-06	08%	2.8E-07	08%	--	--	--	--
Benzo(a)pyrene	1.16E+02	1.46E+01	--	1.00E-02	3.2E-05	72%	2.5E-06	72%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	1.46E+00	--	1.00E-02	3.5E-06	08%	2.7E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	1.46E-01	--	1.00E-02	1.8E-07	<1%	1.3E-08	<1%	--	--	--	--
Chrysene	1.49E+02	1.46E-02	--	1.00E-02	4.2E-08	<1%	3.2E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	1.46E+01	--	1.00E-02	3.9E-06	09%	3.0E-07	09%	--	--	--	--
Fluoranthene	3.13E+02	--	2.00E-02	1.00E-02	--	--	--	--	2.1E-03	10%	1.6E-04	10%
Fluorene	6.61E+01	--	2.00E-02	1.00E-02	--	--	--	--	4.4E-04	02%	3.4E-05	02%
Indeno(1,2,3-cd)pyrene	4.95E+01	1.46E+00	--	1.00E-02	1.4E-06	03%	1.1E-07	03%	--	--	--	--
Naphthalene	1.59E+02	--	2.00E-02	1.00E-02	--	--	--	--	1.1E-03	05%	8.1E-05	05%
Phenanthrene	3.46E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	1.50E-02	1.00E-02	--	--	--	--	2.2E-03	11%	1.7E-04	11%
Pesticides/PCBs												
Aroclor-1254	4.36E-01	2.22E+00	1.80E-05	1.00E-02	1.9E-08	<1%	1.4E-09	<1%	3.2E-03	16%	2.5E-04	16%
Dieldrin	1.88E-02	3.20E+01	2.50E-05	1.00E-02	1.2E-08	<1%	8.8E-10	<1%	1.0E-04	<1%	7.7E-06	<1%
Metals												
Arsenic	1.15E+01	1.88E+00	2.40E-04	1.00E-03	4.1E-08	<1%	3.1E-09	<1%	6.4E-04	03%	4.9E-05	03%
Barium	1.12E+02	--	3.50E-03	1.00E-03	--	--	--	--	4.3E-04	02%	3.3E-05	02%
Cadmium	2.34E+00	--	1.00E-05	1.00E-03	--	--	--	--	3.1E-03	16%	2.4E-04	16%
Chromium	4.01E+01	--	1.00E-04	1.00E-03	--	--	--	--	5.4E-03	27%	4.1E-04	27%
Lead	1.10E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	5.E-05	99%	3.E-06	99%	2.E-02	99%	2.E-03	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.27
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	ADOLESCENT TRESPASSER RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3*/kg-day =*
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.44E-03
CT CIF = 3.61E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.01E-02
CT NIF = 2.53E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

		Toxicity Values (7)		Cancer Risk (8)				Hazard Quotient (9)			
Constituent	EP Conc(6) (mg/kg)	IUR (m^3/µg)	RfC (mg/m^3)	RME	% of Total	CT	% of Total	RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.01E+00	8.30E-06	6.00E-03	1.1E-13	<1%	2.9E-14	<1%	1.6E-08	<1%	4.0E-09	<1%
Semivolatiles											
Carbazole	1.62E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.35E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.10E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	8.36E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.65E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.30E+02	8.80E-05	--	7.9E-11	02%	2.0E-11	02%	--	--	--	--
Benzo(a)pyrene	1.16E+02	8.80E-04	--	7.0E-10	15%	1.8E-10	15%	--	--	--	--
Benzo(b)fluoranthene	1.26E+02	8.80E-05	--	7.6E-11	02%	1.9E-11	02%	--	--	--	--
Benzo(g,h,i)perylene	5.09E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	6.34E+01	8.80E-06	--	3.8E-12	<1%	9.6E-13	<1%	--	--	--	--
Chrysene	1.49E+02	8.80E-07	--	9.0E-13	<1%	2.3E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.41E+01	8.80E-04	--	8.5E-11	02%	2.1E-11	02%	--	--	--	--
Fluoranthene	3.13E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.61E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.95E+01	8.80E-05	--	3.0E-11	<1%	7.5E-12	<1%	--	--	--	--
Naphthalene	1.59E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.46E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.50E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.36E-01	1.00E-04	--	3.0E-13	<1%	7.5E-14	<1%	--	--	--	--
Dieldrin	1.88E-02	4.60E-03	--	6.0E-13	<1%	1.5E-13	<1%	--	--	--	--
Metals											
Arsenic	1.15E+01	4.30E-03	--	3.4E-10	07%	8.5E-11	07%	--	--	--	--
Barium	1.12E+02	--	5.00E-04	--	--	--	--	1.1E-05	100%	2.7E-06	100%
Cadmium	2.34E+00	1.80E-03	--	2.9E-11	<1%	7.3E-12	<1%	--	--	--	--
Chromium	4.01E+01	1.20E-02	--	3.3E-09	71%	8.3E-10	71%	--	--	--	--
Lead	1.10E+02	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	5E-09	99%	1E-09	99%	1E-05	100%	3E-06	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF = 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.2.28
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - INHALATION OF VOLATILE SOIL CONTAMINANTS(0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	ADOLESCENT TRESPASSER RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.44E-03
CT CIF = 3.61E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.01E-02
CT NIF = 2.53E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.01E+00	8.30E-06	6.00E-03	2.45E+03	3.4E-08	100%	8.6E-09	100%	4.8E-03	100%	1.2E-03	100%
				PATHWAY SUMS:	**3E-08**	**100%**	**9E-09**	**100%**	**5E-03**	**100%**	**1E-03**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.29
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME (1)	CT (1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc (2) (ATC), days	25,550	25,550
Avging Time, Noncarc (3) (ATN), days	9,125	1,825
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 1.75E-07
CT CIF = 1.64E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 4.89E-07
CT NIF = 2.29E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect (6) (mg/kg)	Toxicity Values (7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk (8) RME	% of Total	CT	% of Total	Hazard Quotient (9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	2.9E-07	<1%	2.7E-08	<1%	9.3E-03	01%	4.4E-03	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	7.7E-07	<1%	7.2E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	4.3E-02	07%	2.0E-02	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	1.5E-02	02%	6.9E-03	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	3.9E-03	<1%	1.8E-03	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	3.6E-04	09%	3.3E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	3.1E-03	73%	2.9E-04	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	3.3E-04	08%	3.1E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	1.8E-05	<1%	1.7E-06	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	5.0E-06	<1%	4.7E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	2.7E-04	06%	2.5E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	8.2E-02	13%	3.8E-02	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	1.2E-02	02%	5.7E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	1.1E-04	03%	1.1E-05	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	3.5E-02	06%	1.7E-02	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	8.5E-02	14%	4.0E-02	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	1.5E-06	<1%	1.4E-07	<1%	1.1E-01	17%	5.0E-02	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	3.9E-07	<1%	3.7E-08	<1%	1.4E-03	<1%	6.4E-04	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	2.3E-05	<1%	2.1E-06	<1%	1.4E-01	23%	6.6E-02	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	1.6E-02	02%	7.3E-03	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	3.6E-02	06%	1.7E-02	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	3.6E-02	06%	1.7E-02	06%
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	4E-03	99%	4E-04	99%	6E-01	99%	3E-01	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989 and 1992).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.30
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Industrial Worker RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)

RME CIF = 2.03E-05
CT CIF = 6.54E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)

RME NIF = 5.68E-05
CT NIF = 9.16E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	3.5E-07	<1%	1.1E-08	<1%	1.1E-02	<1%	1.8E-03	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	1.8E-06	<1%	5.8E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	9.9E-02	08%	1.6E-02	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	3.4E-02	03%	5.5E-03	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	9.1E-03	<1%	1.5E-03	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	8.3E-04	09%	2.7E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	7.1E-03	74%	2.3E-04	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	7.7E-04	08%	2.5E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	4.1E-05	<1%	1.3E-06	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	1.2E-05	<1%	3.7E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	6.2E-04	06%	2.0E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.9E-01	15%	3.1E-02	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.8E-02	02%	4.6E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	2.7E-04	03%	8.6E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	8.2E-02	07%	1.3E-02	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	2.0E-01	16%	3.2E-02	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	2.0E-06	<1%	6.4E-08	<1%	1.4E-01	11%	2.2E-02	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	9.1E-07	<1%	2.9E-08	<1%	3.2E-03	<1%	5.1E-04	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	3.3E-06	<1%	1.1E-07	<1%	2.0E-02	02%	3.3E-03	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	3.6E-02	03%	5.8E-03	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	2.1E-01	16%	3.3E-02	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	2.1E-01	17%	3.4E-02	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	1.E-02	99%	3.E-04	99%	1.E+00	98%	2.E-01	98%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.31
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Industrial Worker RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	9,125	1,825

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.49E-02
CT CIF = 6.54E-03

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] IUR ($m^3/\mu g$)	RfC (mg/m^3)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	7.9E-11	<1%	1.5E-11	<1%	4.4E-06	<1%	4.2E-06	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	4.1E-08	03%	7.7E-09	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	3.5E-07	27%	6.6E-08	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	3.8E-08	03%	7.1E-09	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	2.1E-09	<1%	3.8E-10	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	5.7E-10	<1%	1.1E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	3.1E-08	02%	5.8E-09	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	1.3E-08	01%	2.5E-09	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	7.3E-11	<1%	1.4E-11	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	1.1E-10	<1%	2.0E-11	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	6.2E-08	05%	1.2E-08	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	2.1E-03	100%	1.9E-03	100%
Cadmium	3.64E+01	1.80E-03	--	1.1E-08	<1%	2.0E-09	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	7.4E-07	57%	1.4E-07	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	1E-06	99%	2E-07	99%	2E-03	100%	2E-03	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

PEF = 7.33E+08

TABLE C.2.32
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
INDUSTRIAL WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Industrial Worker RME (1)	CT (1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	25	5
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	9,125	1,825

INTAKE FACTOR CALCULATIONS(5)
Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.49E-02
CT CIF = 6.54E-03
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	2.4E-05	100%	4.4E-06	100%	1.3E+00	100%	1.2E+00	100%
PATHWAY SUMS:					2E-05	100%	4E-06	100%	1E+00	100%	1E+00	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day).
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.33
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Construction Worker RME(1)	CT(1)
Intake Rate (IR), mg/day	480	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 3.35E-08
CT CIF = 6.54E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 2.35E-06
CT NIF = 4.58E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	Toxicity Values(7) ORfD (mg/kg-d)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	5.5E-08	<1%	1.1E-08	<1%	4.5E-02	01%	8.7E-03	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	1.5E-07	<1%	2.9E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	2.1E-01	07%	4.0E-02	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	7.0E-02	02%	1.4E-02	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	1.9E-02	<1%	3.7E-03	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	6.9E-05	09%	1.3E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	5.9E-04	73%	1.1E-04	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	6.4E-05	08%	1.2E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	3.4E-06	<1%	6.7E-07	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	9.6E-07	<1%	1.9E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	5.1E-05	06%	1.0E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	3.9E-01	13%	7.7E-02	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	5.9E-02	02%	1.1E-02	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	2.2E-05	03%	4.3E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	1.7E-01	06%	3.3E-02	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	4.1E-01	14%	7.9E-02	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	3.0E-07	<1%	5.8E-08	<1%	5.2E-01	17%	1.0E-01	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	7.5E-08	<1%	1.5E-08	<1%	6.6E-03	<1%	1.3E-03	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	4.3E-06	<1%	8.5E-07	<1%	6.8E-01	23%	1.3E-01	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	7.4E-02	02%	1.5E-02	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	1.7E-01	06%	3.3E-02	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	1.7E-01	06%	3.4E-02	06%
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	8E-04	99%	2E-04	99%	3E+00	99%	6E-01	99%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.34
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Construction Worker RME(1)	Construction Worker CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 8.11E-07
CT CIF = 1.31E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 5.68E-05
CT NIF = 9.16E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	Toxicity Values(7) DRfD (mg/kg-d)	Toxicity Values(7) DABS (unitless)	Cancer Risk(8) RME	Cancer Risk(8) % of Total	Cancer Risk(8) CT	Cancer Risk(8) % of Total	Hazard Quotient(9) RME	Hazard Quotient(9) % of Total	Hazard Quotient(9) CT	Hazard Quotient(9) % of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	1.4E-08	<1%	2.3E-09	<1%	1.1E-02	<1%	1.8E-03	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	7.1E-08	<1%	1.2E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	9.9E-02	08%	1.6E-02	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	3.4E-02	03%	5.5E-03	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	9.1E-03	<1%	1.5E-03	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	3.3E-05	09%	5.3E-06	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	2.8E-04	74%	4.6E-05	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	3.1E-05	08%	5.0E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	1.7E-06	<1%	2.7E-07	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	4.6E-07	<1%	7.4E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	2.5E-05	06%	4.0E-06	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.9E-01	15%	3.1E-02	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.8E-02	02%	4.6E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	1.1E-05	03%	1.7E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	8.2E-02	07%	1.3E-02	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	2.0E-01	16%	3.2E-02	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	7.9E-08	<1%	1.3E-08	<1%	1.4E-01	11%	2.2E-02	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	3.6E-08	<1%	5.9E-09	<1%	3.2E-03	<1%	5.1E-04	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	1.3E-07	<1%	2.1E-08	<1%	2.0E-02	02%	3.3E-03	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	3.6E-02	03%	5.8E-03	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	2.1E-01	16%	3.3E-02	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	2.1E-01	17%	3.4E-02	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	**4.E-04**	**99%**	**6.E-05**	**99%**	**1.E+00**	**98%**	**2.E-01**	**98%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989)
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.35
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Construction Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	3.2E-12	<1%	00%	<1%	4.4E-06	<1%	4.2E-06	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	1.6E-09	03%	1.5E-09	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	1.4E-08	27%	1.3E-08	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	1.5E-09	03%	1.4E-09	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	8.2E-11	<1%	7.7E-11	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	2.3E-11	<1%	2.1E-11	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	1.2E-09	02%	1.2E-09	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	5.3E-10	01%	4.9E-10	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	2.9E-12	<1%	2.7E-12	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	4.3E-12	<1%	4.0E-12	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	2.5E-09	05%	2.3E-09	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	2.1E-03	100%	1.9E-03	100%
Cadmium	3.64E+01	1.80E-03	--	4.4E-10	<1%	4.1E-10	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	3.0E-08	57%	2.8E-08	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	5E-08	99%	5E-08	99%	2E-03	100%	2E-03	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

PEF = 7.33E+08

TABLE C.2.36
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Construction Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	9.5E-07	100%	8.9E-07	100%	1.3E+00	100%	1.2E+00	100%
				PATHWAY SUMS:	**9E-07**	**100%**	**9E-07**	**100%**	**1E+00**	**100%**	**1E+00**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.37
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Adult Recreator RME(1)	CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 6.71E-08
CT CIF = 4.89E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.96E-07
CT NIF = 4.89E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	1.1E-07	<1%	8.1E-09	<1%	3.7E-03	01%	9.3E-04	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	3.0E-07	<1%	2.2E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	1.7E-02	07%	4.3E-03	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	5.9E-03	02%	1.5E-03	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	1.6E-03	<1%	3.9E-04	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	1.4E-04	09%	1.0E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	1.2E-03	73%	8.6E-05	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	1.3E-04	08%	9.3E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	6.9E-06	<1%	5.0E-07	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	1.9E-06	<1%	1.4E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	1.0E-04	06%	7.5E-06	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	3.3E-02	13%	8.2E-03	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	4.9E-03	02%	1.2E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	4.4E-05	03%	3.2E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	1.4E-02	06%	3.5E-03	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	3.4E-02	14%	8.5E-03	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	5.9E-07	<1%	4.3E-08	<1%	4.3E-02	17%	1.1E-02	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	1.5E-07	<1%	1.1E-08	<1%	5.5E-04	<1%	1.4E-04	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	8.7E-06	<1%	6.3E-07	<1%	5.6E-02	23%	1.4E-02	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	6.2E-03	02%	1.6E-03	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	1.4E-02	06%	3.6E-03	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	1.4E-02	06%	3.6E-03	06%
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-03	99%	1E-04	99%	2E-01	99%	6E-02	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.38
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Adult Recreator RME[1]	CT[1]
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 7.78E-06
CT CIF = 1.96E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 2.27E-05
CT NIF = 1.96E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	1.4E-07	<1%	3.4E-09	<1%	4.5E-03	<1%	3.9E-04	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	6.8E-07	<1%	1.7E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	4.0E-02	08%	3.4E-03	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	1.4E-02	03%	1.2E-03	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	3.6E-03	<1%	3.1E-04	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	3.2E-04	09%	8.0E-06	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	2.7E-03	74%	6.9E-05	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	3.0E-04	08%	7.4E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	1.6E-05	<1%	4.0E-07	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	4.4E-06	<1%	1.1E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	2.4E-04	06%	6.0E-06	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	7.6E-02	15%	6.6E-03	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.1E-02	02%	9.8E-04	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	1.0E-04	03%	2.6E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	3.3E-02	07%	2.8E-03	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	7.9E-02	16%	6.8E-03	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	7.6E-07	<1%	1.9E-08	<1%	5.5E-02	11%	4.8E-03	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	3.5E-07	<1%	8.8E-09	<1%	1.3E-03	<1%	1.1E-04	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	1.3E-06	<1%	3.2E-08	<1%	8.2E-03	02%	7.0E-04	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	1.4E-02	03%	1.2E-03	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	8.3E-02	16%	7.1E-03	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	8.4E-02	17%	7.2E-03	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	4.E-03	99%	9.E-05	99%	5.E-01	98%	4.E-02	98%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.39
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Adult Recreator RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 4.46E-03
CT CIF = 3.25E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.30E-02
CT NIF = 3.25E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values (7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	1.0E-11	<1%	00%	<1%	5.9E-07	<1%	1.5E-07	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	5.2E-09	03%	3.8E-10	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	4.5E-08	27%	3.3E-09	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	4.9E-09	03%	3.5E-10	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	2.6E-10	<1%	1.9E-11	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	7.3E-11	<1%	5.3E-12	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	3.9E-09	02%	2.9E-10	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	1.7E-09	01%	1.2E-10	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	9.4E-12	<1%	6.8E-13	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	1.4E-11	<1%	1.0E-12	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	7.9E-09	05%	5.8E-10	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	2.8E-04	100%	6.9E-05	100%
Cadmium	3.64E+01	1.80E-03	--	1.4E-09	<1%	1.0E-10	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	9.4E-08	57%	6.9E-09	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	2E-07	99%	1E-08	99%	3E-04	100%	7E-05	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information

PEF = 7.33E+08

TABLE C.2.40
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Adult Recreator RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS[5]
Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 4.46E-03
CT CIF = 3.25E-04
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.30E-02
CT NIF = 3.25E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	3.0E-06	100%	2.2E-07	100%	1.8E-01	100%	4.4E-02	100%
				PATHWAY SUMS:	3E-06	1E+00	2E-07	1E+00	2E-01	1E+00	4E-02	1E+00

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.41
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Child Recreator RME(1)	CT(1)
Intake Rate (IR), mg/day	200	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 1.57E-07
CT CIF = 1.30E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.83E-06
CT NIF = 4.57E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	RfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	2.6E-07	<1%	2.2E-08	<1%	3.5E-02	01%	8.7E-03	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	6.9E-07	<1%	5.7E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	1.6E-01	07%	4.0E-02	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	5.5E-02	02%	1.4E-02	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	1.5E-02	<1%	3.7E-03	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	3.2E-04	09%	2.7E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	2.7E-03	73%	2.3E-04	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	3.0E-04	08%	2.5E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	1.6E-05	<1%	1.3E-06	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	4.5E-06	<1%	3.7E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	2.4E-04	06%	2.0E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	3.1E-01	13%	7.6E-02	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	4.6E-02	02%	1.1E-02	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	1.0E-04	03%	8.6E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	1.3E-01	06%	3.3E-02	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	3.2E-01	14%	7.9E-02	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	1.4E-06	<1%	1.1E-07	<1%	4.0E-01	17%	1.0E-01	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	3.5E-07	<1%	2.9E-08	<1%	5.1E-03	<1%	1.3E-03	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	2.0E-05	<1%	1.7E-06	<1%	5.3E-01	23%	1.3E-01	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	5.8E-02	02%	1.4E-02	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	1.3E-01	06%	3.3E-02	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	1.3E-01	06%	3.4E-02	06%
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**4E-03**	**99%**	**3E-04**	**99%**	**2E+00**	**99%**	**6E-01**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

Table C.2.42
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Child Recreator RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	2300	1980
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 3.60E-06
CT CIF = 1.03E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 4.20E-05
CT NIF = 3.62E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	6.3E-08	<1%	1.8E-09	<1%	8.4E-03	<1%	7.2E-04	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	3.2E-07	<1%	9.1E-09	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	7.4E-02	08%	6.3E-03	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	2.5E-02	03%	2.2E-03	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	6.7E-03	<1%	5.8E-04	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	1.5E-04	09%	4.2E-06	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	1.3E-03	74%	3.6E-05	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	1.4E-04	08%	3.9E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	7.4E-06	<1%	2.1E-07	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	2.1E-06	<1%	5.9E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	1.1E-04	06%	3.2E-06	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.4E-01	15%	1.2E-02	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.1E-02	02%	1.8E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	4.7E-05	03%	1.4E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	6.1E-02	07%	5.2E-03	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	1.5E-01	16%	1.3E-02	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	3.5E-07	<1%	1.0E-08	<1%	1.0E-01	11%	8.8E-03	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	1.6E-07	<1%	4.6E-09	<1%	2.4E-03	<1%	2.0E-04	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	5.8E-07	<1%	1.7E-08	<1%	1.5E-02	02%	1.3E-03	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	2.7E-02	03%	2.3E-03	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	1.5E-01	16%	1.3E-02	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	1.6E-01	17%	1.3E-02	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	2.E-03	99%	5.E-05	99%	9.E-01	98%	8.E-02	98%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

Table C.2.43
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 -10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Child Recreator RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR *ET * EF * ED) / (BW * ATC)
RME CIF = 3.91E-03
CT CIF = 3.26E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 4.57E-02
CT NIF = 1.14E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	8.8E-12	<1%	7.36E-13	<1%	2.1E-06	<1%	5.2E-07	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	4.6E-09	03%	3.8E-10	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	3.9E-08	27%	3.3E-09	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	4.3E-09	03%	3.6E-10	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	2.3E-10	<1%	1.9E-11	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	6.4E-11	<1%	5.3E-12	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	3.5E-09	02%	2.9E-10	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	1.5E-09	01%	1.2E-10	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	8.2E-12	<1%	6.8E-13	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	1.2E-11	<1%	1.0E-12	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	6.9E-09	05%	5.8E-10	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	9.7E-04	100%	2.4E-04	100%
Cadmium	3.64E+01	1.80E-03	--	1.2E-09	<1%	1.0E-10	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	8.3E-08	57%	6.9E-09	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	1E-07	99%	1E-08	99%	1E-03	100%	2E-04	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF = 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989)
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg).
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day).
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.
NC - Not calculable due to lack of toxicity or other chemical-specific information.

Table C.2.44
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RECREATOR - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS (0 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Child Recreator RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	100	50
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 3.91E-03
CT CIF = 3.26E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 4.57E-02
CT NIF = 1.14E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	2.6E-06	100%	2.2E-07	100%	6.2E-01	100%	1.6E-01	100%
				PATHWAY SUMS:	**3E-06**	**100%**	**2E-07**	**100%**	**6E-01**	**100%**	**2E-01**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.45
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Adult Resident RME[1]	CT[1]
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS [5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 2.35E-07
CT CIF = 2.45E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 6.85E-07
CT NIF = 2.45E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	3.9E-07	<1%	4.0E-08	<1%	1.3E-02	01%	4.6E-03	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	1.0E-06	<1%	1.1E-07	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	6.0E-02	07%	2.1E-02	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	2.1E-02	02%	7.3E-03	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	5.5E-03	<1%	2.0E-03	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	4.8E-04	09%	5.0E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	4.1E-03	73%	4.3E-04	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	4.5E-04	08%	4.6E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	2.4E-05	<1%	2.5E-06	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	6.7E-06	<1%	7.0E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	3.6E-04	06%	3.8E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	1.1E-01	13%	4.1E-02	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	1.7E-02	02%	6.1E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	1.5E-04	03%	1.6E-05	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	5.0E-02	06%	1.8E-02	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	1.2E-01	14%	4.2E-02	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	2.1E-06	<1%	2.2E-07	<1%	1.5E-01	17%	5.4E-02	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	5.3E-07	<1%	5.5E-08	<1%	1.9E-03	<1%	6.8E-04	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	3.0E-05	<1%	3.2E-06	<1%	2.0E-01	23%	7.0E-02	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	2.2E-02	02%	7.8E-03	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	5.0E-02	06%	1.8E-02	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	5.1E-02	06%	1.8E-02	06%
Lead	1.61E+03	--	--	--	--	.	--	--	--	--	--
			PATHWAY SUMS:	**6E-03**	**99%**	**6E-04**	**99%**	**9E-01**	**99%**	**3E-01**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.46
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Adult Resident RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 2.72E-05
CT CIF = 9.78E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 7.95E-05
CT NIF = 9.78E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	4.7E-07	<1%	1.7E-08	<1%	1.6E-02	<1%	2.0E-03	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	2.4E-06	<1%	8.6E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.4E-01	08%	1.7E-02	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	4.8E-02	03%	5.9E-03	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	1.3E-02	<1%	1.6E-03	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	1.1E-03	09%	4.0E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	9.5E-03	74%	3.4E-04	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	1.0E-03	08%	3.7E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	5.6E-05	<1%	2.0E-06	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	1.6E-05	<1%	5.6E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	8.4E-04	06%	3.0E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.7E-01	15%	3.3E-02	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	4.0E-02	02%	4.9E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	3.6E-04	03%	1.3E-05	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.2E-01	07%	1.4E-02	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	2.8E-01	16%	3.4E-02	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	2.7E-06	<1%	9.6E-08	<1%	1.9E-01	11%	2.4E-02	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	1.2E-06	<1%	4.4E-08	<1%	4.4E-03	<1%	5.5E-04	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	4.4E-06	<1%	1.6E-07	<1%	2.9E-02	02%	3.5E-03	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	5.0E-02	03%	6.2E-03	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	2.9E-01	16%	3.6E-02	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	2.9E-01	17%	3.6E-02	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	1.E-02	99%	5.E-04	99%	2.E+00	98%	2.E-01	98%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.47
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Adult Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 9.36E-02
CT CIF = 1.95E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 2.73E-01
CT NIF = 1.95E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) IUR ($m^3/\mu g$)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	2.1E-10	<1%	00%	<1%	1.2E-05	<1%	8.8E-06	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	1.1E-07	03%	2.3E-08	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	9.4E-07	27%	2.0E-07	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	1.0E-07	03%	2.1E-08	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	5.5E-09	<1%	1.1E-09	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	1.5E-09	<1%	3.2E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	8.2E-08	02%	1.7E-08	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	3.5E-08	01%	7.4E-09	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	2.0E-10	<1%	4.1E-11	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	2.9E-10	<1%	6.0E-11	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	1.7E-07	05%	3.5E-08	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	5.8E-03	100%	4.1E-03	100%
Cadmium	3.64E+01	1.80E-03	--	2.9E-08	<1%	6.1E-09	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	2.0E-06	57%	4.1E-07	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	3E-06	99%	7E-07	99%	6E-03	100%	4E-03	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.

PEF = 7.33E+08

5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg). Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day). Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.2.48
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADULT RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Adult Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	24	7
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	8,760	2,555

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 9.36E-02
CT CIF = 1.95E-02

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 2.73E-01
CT NIF = 1.95E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	6.3E-05	100%	1.3E-05	100%	3.7E+00	100%	2.6E+00	100%
				PATHWAY SUMS:	6E-05	1E+00	1E-05	1E+00	4E+00	1E+00	3E+00	1E+00

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.49
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Child Resident RME(1)	CT(1)
Intake Rate (IR), mg/day	200	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 5.48E-07
CT CIF = 6.52E-08
Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 6.39E-06
CT NIF = 2.28E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values (7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	9.1E-07	<1%	1.1E-07	<1%	1.2E-01	01%	4.3E-02	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	2.4E-06	<1%	2.9E-07	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	5.6E-01	07%	2.0E-01	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	1.9E-01	02%	6.8E-02	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	5.1E-02	<1%	1.8E-02	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	1.1E-03	09%	1.3E-04	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	9.6E-03	73%	1.1E-03	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	1.0E-03	08%	1.2E-04	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	5.6E-05	<1%	6.7E-06	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	1.6E-05	<1%	1.9E-06	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	8.4E-04	06%	1.0E-04	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	1.1E+00	13%	3.8E-01	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	1.6E-01	02%	5.7E-02	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	3.6E-04	03%	4.3E-05	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	4.6E-01	06%	1.7E-01	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	1.1E+00	14%	4.0E-01	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	4.8E-06	<1%	5.7E-07	<1%	1.4E+00	17%	5.0E-01	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	1.2E-06	<1%	1.5E-07	<1%	1.8E-02	<1%	6.4E-03	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	7.1E-05	<1%	8.5E-06	<1%	1.8E+00	23%	6.6E-01	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	2.0E-01	02%	7.2E-02	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	4.7E-01	06%	1.7E-01	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	4.7E-01	06%	1.7E-01	06%
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	1E-02	99%	2E-03	99%	8E+00	99%	3E+00	99%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.50
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Child Resident RME(1)	CT(1)
Skin Surface Area (SA), cm^2/event	2300	1980
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 1.26E-05
CT CIF = 5.17E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 1.47E-04
CT NIF = 1.81E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	2.2E-07	<1%	9.0E-09	<1%	2.9E-02	<1%	3.6E-03	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	1.1E-06	<1%	4.5E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.6E-01	08%	3.2E-02	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	8.8E-02	03%	1.1E-02	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	2.4E-02	<1%	2.9E-03	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	5.2E-04	09%	2.1E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	4.4E-03	74%	1.8E-04	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	4.8E-04	08%	2.0E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	2.6E-05	<1%	1.1E-06	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	7.2E-06	<1%	2.9E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	3.9E-04	06%	1.6E-05	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	4.9E-01	15%	6.1E-02	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	7.4E-02	02%	9.0E-03	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	1.7E-04	03%	6.8E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.1E-01	07%	2.6E-02	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	5.1E-01	16%	6.3E-02	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	1.2E-06	<1%	5.1E-08	<1%	3.6E-01	11%	4.4E-02	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	5.6E-07	<1%	2.3E-08	<1%	8.2E-03	<1%	1.0E-03	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	2.0E-06	<1%	8.4E-08	<1%	5.3E-02	02%	6.5E-03	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	9.3E-02	03%	1.1E-02	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	5.4E-01	16%	6.6E-02	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	5.4E-01	17%	6.7E-02	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	**6.E-03**	**99%**	**2.E-04**	**99%**	**3.E+00**	**98%**	**4.E-01**	**98%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.51
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Child Resident RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 8.22E-02
CT CIF = 1.96E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.59E-01
CT NIF = 6.85E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	1.9E-10	<1%	00%	<1%	4.3E-05	<1%	3.1E-05	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	9.7E-08	03%	2.3E-08	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	8.3E-07	27%	2.0E-07	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	9.0E-08	03%	2.1E-08	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	4.8E-09	<1%	1.2E-09	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	1.3E-09	<1%	3.2E-10	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	7.2E-08	02%	1.7E-08	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	3.1E-08	01%	7.4E-09	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	1.7E-10	<1%	4.1E-11	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	2.5E-10	<1%	6.0E-11	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	1.5E-07	05%	3.5E-08	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	2.0E-02	100%	1.5E-02	100%
Cadmium	3.64E+01	1.80E-03	--	2.6E-08	<1%	6.1E-09	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	1.7E-06	57%	4.1E-07	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	3E-06	99%	7E-07	99%	2E-02	100%	1E-02	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

PEF = 7.33E+08

TABLE C.2.52
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CHILD RESIDENT - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Child Resident RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	0.625	0.625
Exposure Time (ET), hrs/day	24	24
Exposure Frequency (EF), days/yr	350	250
Exposure Duration (ED), yrs	6	2
Body Weight (BW), kg	15	15
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	2,190	730

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 8.22E-02
CT CIF = 1.96E-02

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.59E-01
CT NIF = 6.85E-01

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	5.6E-05	100%	1.3E-05	100%	1.3E+01	100%	9.3E+00	100%
				PATHWAY SUMS:	**6E-05**	**100%**	**1E-05**	**100%**	**1E+01**	**100%**	**9E+00**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg). Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

TABLE C.2.53
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INGESTION OF SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:(4)	Adolescent Trespasser RME(1)	Adolescent Trespasser CT(1)
Intake Rate (IR), mg/day	100	50
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	3,650	3,650
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 2.17E-08
CT CIF = 5.44E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 1.52E-07
CT NIF = 3.81E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect(6) (mg/kg)	Toxicity Values(7) OSF (kg-d/mg)	Toxicity Values(7) ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	Cancer Risk(8) CT	% of Total	Hazard Quotient(9) RME	% of Total	Hazard Quotient(9) CT	% of Total
Volatiles											
Benzene	5.70E+01	2.90E-02	3.00E-03	3.6E-08	<1%	9.0E-09	<1%	2.9E-03	01%	7.2E-04	01%
Semivolatiles											
Carbazole	2.20E+02	2.00E-02	--	9.6E-08	<1%	2.4E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	4.00E-02	--	--	--	--	1.3E-02	07%	3.3E-03	07%
Acenaphthene	1.80E+03	--	6.00E-02	--	--	--	--	4.6E-03	02%	1.1E-03	02%
Anthracene	2.40E+03	--	3.00E-01	--	--	--	--	1.2E-03	<1%	3.0E-04	<1%
Benzo(a)anthracene	2.80E+03	7.30E-01	--	4.4E-05	09%	1.1E-05	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	7.30E+00	--	3.8E-04	73%	9.5E-05	73%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	7.30E-01	--	4.1E-05	08%	1.0E-05	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	7.30E-02	--	2.2E-06	<1%	5.6E-07	<1%	--	--	--	--
Chrysene	3.90E+03	7.30E-03	--	6.2E-07	<1%	1.5E-07	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	7.30E+00	--	3.3E-05	06%	8.3E-06	06%	--	--	--	--
Fluoranthene	6.70E+03	--	4.00E-02	--	--	--	--	2.5E-02	13%	6.4E-03	13%
Fluorene	1.00E+03	--	4.00E-02	--	--	--	--	3.8E-03	02%	9.5E-04	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	7.30E-01	--	1.4E-05	03%	3.6E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	4.00E-02	--	--	--	--	1.1E-02	06%	2.8E-03	06%
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	3.00E-02	--	--	--	--	2.6E-02	14%	6.6E-03	14%
Pesticides/PCBs											
Aroclor-1254	4.40E+00	2.00E+00	2.00E-05	1.9E-07	<1%	4.8E-08	<1%	3.3E-02	17%	8.4E-03	17%
Dieldrin	1.40E-01	1.60E+01	5.00E-05	4.9E-08	<1%	1.2E-08	<1%	4.3E-04	<1%	1.1E-04	<1%
Metals											
Arsenic	8.64E+01	1.50E+00	3.00E-04	2.8E-06	<1%	7.0E-07	<1%	4.4E-02	23%	1.1E-02	23%
Barium	2.22E+03	--	7.00E-02	--	--	--	--	4.8E-03	02%	1.2E-03	02%
Cadmium	3.64E+01	--	5.00E-04	--	--	--	--	1.1E-02	06%	2.8E-03	06%
Chromium	3.69E+02	--	5.00E-03	--	--	--	--	1.1E-02	06%	2.8E-03	06%
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	**5E-04**	**99%**	**1E-04**	**99%**	**2E-01**	**99%**	**5E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day).

TABLE C.2.54
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
DERMAL EXPOSURE TO SOIL - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Adolescent Trespasser RME[1]	CT[1]
Skin Surface Area (SA), cm^2/event	4400	3350
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	3,650	3,650
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS [5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 1.91E-06
CT CIF = 1.46E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 1.34E-05
CT NIF = 1.02E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] DSF (kg-d/mg)	DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	3.05E-02	2.85E-03	1.00E-02	3.3E-08	<1%	2.5E-09	<1%	2.7E-03	<1%	2.0E-04	<1%
Semivolatiles												
Carbazole	2.20E+02	4.00E-02	--	1.00E-02	1.7E-07	<1%	1.3E-08	<1%	--	--	--	--
Dibenzofuran	1.50E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	3.50E+03	--	2.00E-02	1.00E-02	--	--	--	--	2.3E-02	08%	1.8E-03	08%
Acenaphthene	1.80E+03	--	3.00E-02	1.00E-02	--	--	--	--	8.0E-03	03%	6.1E-04	03%
Anthracene	2.40E+03	--	1.50E-01	1.00E-02	--	--	--	--	2.1E-03	<1%	1.6E-04	<1%
Benzo(a)anthracene	2.80E+03	1.46E+00	--	1.00E-02	7.8E-05	09%	6.0E-06	09%	--	--	--	--
Benzo(a)pyrene	2.40E+03	1.46E+01	--	1.00E-02	6.7E-04	74%	5.1E-05	74%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	1.46E+00	--	1.00E-02	7.3E-05	08%	5.5E-06	08%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	1.46E-01	--	1.00E-02	3.9E-06	<1%	3.0E-07	<1%	--	--	--	--
Chrysene	3.90E+03	1.46E-02	--	1.00E-02	1.1E-06	<1%	8.3E-08	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	1.46E+01	--	1.00E-02	5.9E-05	06%	4.5E-06	06%	--	--	--	--
Fluoranthene	6.70E+03	--	2.00E-02	1.00E-02	--	--	--	--	4.5E-02	15%	3.4E-03	15%
Fluorene	1.00E+03	--	2.00E-02	1.00E-02	--	--	--	--	6.7E-03	02%	5.1E-04	02%
Indeno(1,2,3-cd)pyrene	9.00E+02	1.46E+00	--	1.00E-02	2.5E-05	03%	1.9E-06	03%	--	--	--	--
Naphthalene	2.90E+03	--	2.00E-02	1.00E-02	--	--	--	--	1.9E-02	07%	1.5E-03	07%
Phenanthrene	8.10E+03	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	1.50E-02	1.00E-02	--	--	--	--	4.6E-02	16%	3.5E-03	16%
Pesticides/PCBs												
Aroclor-1254	4.40E+00	2.22E+00	1.80E-05	1.00E-02	1.9E-07	<1%	1.4E-08	<1%	3.3E-02	11%	2.5E-03	11%
Dieldrin	1.40E-01	3.20E+01	2.50E-05	1.00E-02	8.6E-08	<1%	6.5E-09	<1%	7.5E-04	<1%	5.7E-05	<1%
Metals												
Arsenic	8.64E+01	1.88E+00	2.40E-04	1.00E-03	3.1E-07	<1%	2.4E-08	<1%	4.8E-03	02%	3.7E-04	02%
Barium	2.22E+03	--	3.50E-03	1.00E-03	--	--	--	--	8.5E-03	03%	6.5E-04	03%
Cadmium	3.64E+01	--	1.00E-05	1.00E-03	--	--	--	--	4.9E-02	16%	3.7E-03	16%
Chromium	3.69E+02	--	1.00E-04	1.00E-03	--	--	--	--	4.9E-02	17%	3.8E-03	17%
Lead	1.61E+03	--	--	1.00E-03	--	--	--	--	--	--	--	--
				PATHWAY SUMS:	**9.E-04**	**99%**	**7.E-05**	**99%**	**3.E-01**	**98%**	**2.E-02**	**98%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989)
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.2.55
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]	Adolescent Trespassers RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	3,650	3,650

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.44E-03
CT CIF = 3.61E-04

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.01E-02
CT NIF = 2.53E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles											
Benzene	5.70E+01	8.30E-06	6.00E-03	3.3E-12	<1%	00%	<1%	4.6E-07	<1%	1.1E-07	<1%
Semivolatiles											
Carbazole	2.20E+02	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.50E+02	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	3.50E+03	--	--	--	--	--	--	--	--	--	--
Acenaphthene	1.80E+03	--	--	--	--	--	--	--	--	--	--
Anthracene	2.40E+03	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	2.80E+03	8.80E-05	--	1.7E-09	03%	4.2E-10	03%	--	--	--	--
Benzo(a)pyrene	2.40E+03	8.80E-04	--	1.5E-08	27%	3.6E-09	27%	--	--	--	--
Benzo(b)fluoranthene	2.60E+03	8.80E-05	--	1.6E-09	03%	3.9E-10	03%	--	--	--	--
Benzo(g,h,i)perylene	9.60E+02	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	1.40E+03	8.80E-06	--	8.5E-11	<1%	2.1E-11	<1%	--	--	--	--
Chrysene	3.90E+03	8.80E-07	--	2.4E-11	<1%	5.9E-12	<1%	--	--	--	--
Dibenz(a,h)anthracene	2.10E+02	8.80E-04	--	1.3E-09	02%	3.2E-10	02%	--	--	--	--
Fluoranthene	6.70E+03	--	--	--	--	--	--	--	--	--	--
Fluorene	1.00E+03	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	9.00E+02	8.80E-05	--	5.5E-10	01%	1.4E-10	01%	--	--	--	--
Naphthalene	2.90E+03	--	--	--	--	--	--	--	--	--	--
Phenanthrene	8.10E+03	--	--	--	--	--	--	--	--	--	--
Pyrene	5.20E+03	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	4.40E+00	1.00E-04	--	3.0E-12	<1%	7.6E-13	<1%	--	--	--	--
Dieldrin	1.40E-01	4.60E-03	--	4.4E-12	<1%	1.1E-12	<1%	--	--	--	--
Metals											
Arsenic	8.64E+01	4.30E-03	--	2.6E-09	05%	6.4E-10	05%	--	--	--	--
Barium	2.22E+03	--	5.00E-04	--	--	--	--	2.1E-04	100%	5.4E-05	100%
Cadmium	3.64E+01	1.80E-03	--	4.5E-10	<1%	1.1E-10	<1%	--	--	--	--
Chromium	3.69E+02	1.20E-02	--	3.1E-08	57%	7.6E-09	57%	--	--	--	--
Lead	1.61E+03	--	--	--	--	--	--	--	--	--	--
			PATHWAY SUMS:	5E-08	99%	1E-08	99%	2E-04	100%	5E-05	100%

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year. PEF = 7.33E+08
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg).
Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.
NC - Not calculable due to lack of toxicity or other chemical-specific information

TABLE C.2.56
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
ADOLESCENT TRESPASSER - EVALUATION OF MAXIMUM DETECTED CONCENTRATIONS
INHALATION OF VOLATILE SOIL CONTAMINANTS - (0 - 10 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS:[4]

	Adolescent Trespassers RME[1]	CT[1]
Inhalation Rate (IR), m^3/hr	0.83	0.83
Exposure Time (ET), hrs/day	4	2
Exposure Frequency (EF), days/yr	50	25
Exposure Duration (ED), yrs	10	10
Body Weight (BW), kg	45	45
Avging Time, Carc[2] (ATC), days	25,550	25,550
Avging Time, Noncarc[3] (ATN), days	3,650	3,650

INTAKE FACTOR CALCULATIONS[5]

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.44E-03
CT CIF = 3.61E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 1.01E-02
CT NIF = 2.53E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	Max Detect[6] (mg/kg)	Toxicity Values[7] IUR (m^3/µg)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk[8] RME	% of Total	CT	% of Total	Hazard Quotient[9] RME	% of Total	CT	% of Total
Volatiles												
Benzene	5.70E+01	8.30E-06	6.00E-03	2.45E+03	9.8E-07	100%	2.4E-07	100%	1.4E-01	100%	3.4E-02	100%
				PATHWAY SUMS:	**1E-06**	**100%**	**2E-07**	**100%**	**1E-01**	**100%**	**3E-02**	**100%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Maximum detected concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

APPENDIX C.3

RISK CALCULATION TABLES
(0 - 20 FEET)

TABLE C.3.1
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - INGESTION OF SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	CT(1)
Intake Rate (IR), mg/day	480	100
Fraction Ingested (FI), unitless	0.5	0.5
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATC)
RME CIF = 3.35E-08
CT CIF = 6.54E-09

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF) / (BW * ATN)
RME NIF = 2.35E-06
CT NIF = 4.58E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) OSF (kg-d/mg)	ORfD (mg/kg-d)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.48E+00	2.90E-02	3.00E-03	2.4E-09	<1%	4.7E-10	<1%	1.9E-03	<1%	3.8E-04	<1%
Semivolatiles											
Carbazole	1.66E+01	2.00E-02	--	1.1E-08	<1%	2.2E-09	<1%	--	--	--	--
Dibenzofuran	1.64E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.05E+02	--	4.00E-02	--	--	--	--	6.2E-03	03%	1.2E-03	03%
Acenaphthene	7.67E+01	--	6.00E-02	--	--	--	--	3.0E-03	01%	5.9E-04	01%
Anthracene	9.54E+01	--	3.00E-01	--	--	--	--	7.5E-04	<1%	1.5E-04	<1%
Benzo(a)anthracene	1.12E+02	7.30E-01	--	2.7E-06	08%	5.3E-07	08%	--	--	--	--
Benzo(a)pyrene	9.94E+01	7.30E+00	--	2.4E-05	69%	4.7E-06	69%	--	--	--	--
Benzo(b)fluoranthene	1.11E+02	7.30E-01	--	2.7E-06	08%	5.3E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	4.33E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	5.39E+01	7.30E-02	--	1.3E-07	<1%	2.6E-08	<1%	--	--	--	--
Chrysene	1.28E+02	7.30E-03	--	3.1E-08	<1%	6.1E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.44E+01	7.30E+00	--	3.5E-06	10%	6.9E-07	10%	--	--	--	--
Fluoranthene	2.66E+02	--	4.00E-02	--	--	--	--	1.6E-02	07%	3.0E-03	07%
Fluorene	6.12E+01	--	4.00E-02	--	--	--	--	3.6E-03	02%	7.0E-04	02%
Indeno(1,2,3-cd)pyrene	4.35E+01	7.30E-01	--	1.1E-06	03%	2.1E-07	03%	--	--	--	--
Naphthalene	1.78E+02	--	4.00E-02	--	--	--	--	1.0E-02	04%	2.0E-03	04%
Phenanthrene	3.19E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.15E+02	--	3.00E-02	--	--	--	--	1.7E-02	07%	3.3E-03	07%
Pesticides/PCBs											
Aroclor-1254	3.97E-01	2.00E+00	2.00E-05	2.7E-08	<1%	5.2E-09	<1%	4.7E-02	20%	9.1E-03	20%
Dieldrin	1.81E-02	1.60E+01	5.00E-05	9.7E-09	<1%	1.9E-09	<1%	8.5E-04	<1%	1.7E-04	<1%
Metals											
Arsenic	1.24E+01	1.50E+00	3.00E-04	6.2E-07	02%	1.2E-07	02%	9.7E-02	41%	1.9E-02	41%
Barium	1.06E+02	--	7.00E-02	--	--	--	--	3.6E-03	01%	6.9E-04	01%
Cadmium	2.06E+00	--	5.00E-04	--	--	--	--	9.7E-03	04%	1.9E-03	04%
Chromium	3.72E+01	--	5.00E-03	--	--	--	--	1.7E-02	07%	3.4E-03	07%
Lead	1.26E+02	--	--	--	--	--	--	--	--	--	--
Mercury	6.94E-01	--	3.00E-04	--	--	--	--	5.4E-03	02%	1.1E-03	02%
			PATHWAY SUMS:	**4E-05**	**99%**	**7E-06**	**99%**	**2E-01**	**99%**	**5E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day)

TABLE C.3.2
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - DERMAL EXPOSURE TO SOIL (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	Construction Worker CT(1)
Skin Surface Area (SA), cm^2/event	5800	5000
Soil-to-Skin Adherance (SK), mg/cm^2	1	0.2
Exposure Frequency (EF), events/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365
Conversion Factor (CF), kg/mg	1.00E-06	1.00E-06

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATC)
RME CIF = 8.11E-07
CT CIF = 1.30836E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK * EF * ED * CF) / (BW * ATN)
RME NIF = 5.68E-05
CT NIF = 9.15851E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) DSF (kg-d/mg)	Toxicity Values (7) DRfD (mg/kg-d)	DABS (unitless)	Cancer Risk(8) RME	% of Total	Cancer Risk(8) CT	% of Total	Hazard Quotient(9) RME	% of Total	Hazard Quotient(9) CT	% of Total
Volatiles												
Benzene	2.48E+00	3.05E-02	2.85E-03	1.00E-02	6.1E-10	<1%	9.9E-11	<1%	4.9E-04	<1%	8.0E-05	<1%
Semivolatiles												
Carbazole	1.66E+01	4.00E-02	--	1.00E-02	5.4E-09	<1%	8.7E-10	<1%	--	--	--	--
Dibenzofuran	1.64E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Semivolatiles-PAHs												
2-Methylnaphthalene	1.05E+02	--	2.00E-02	1.00E-02	--	--	--	--	3.0E-03	03%	4.8E-04	03%
Acenaphthene	7.67E+01	--	3.00E-02	1.00E-02	--	--	--	--	1.5E-03	02%	2.3E-04	02%
Anthracene	9.54E+01	--	1.50E-01	1.00E-02	--	--	--	--	3.6E-04	<1%	5.8E-05	<1%
Benzo(a)anthracene	1.12E+02	1.46E+00	--	1.00E-02	1.3E-06	08%	2.1E-07	08%	--	--	--	--
Benzo(a)pyrene	9.94E+01	1.46E+01	--	1.00E-02	1.2E-05	70%	1.9E-06	70%	--	--	--	--
Benzo(b)fluoranthene	1.11E+02	1.46E+00	--	1.00E-02	1.3E-06	08%	2.1E-07	08%	--	--	--	--
Benzo(g,h,i)perylene	4.33E+01	--	--	1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	5.39E+01	1.46E-01	--	1.00E-02	6.4E-08	<1%	1.0E-08	<1%	--	--	--	--
Chrysene	1.28E+02	1.46E-02	--	1.00E-02	1.5E-08	<1%	2.4E-09	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.44E+01	1.46E+01	--	1.00E-02	1.7E-06	10%	2.8E-07	10%	--	--	--	--
Fluoranthene	2.66E+02	--	2.00E-02	1.00E-02	--	--	--	--	7.5E-03	08%	1.2E-03	08%
Fluorene	6.12E+01	--	2.00E-02	1.00E-02	--	--	--	--	1.7E-03	02%	2.8E-04	02%
Indeno(1,2,3-cd)pyrene	4.35E+01	1.46E+00	--	1.00E-02	5.1E-07	03%	8.3E-08	03%	--	--	--	--
Naphthalene	1.78E+02	--	2.00E-02	1.00E-02	--	--	--	--	5.1E-03	06%	8.2E-04	06%
Phenanthrene	3.19E+02	--	--	1.00E-02	--	--	--	--	--	--	--	--
Pyrene	2.15E+02	--	1.50E-02	1.00E-02	--	--	--	--	8.1E-03	09%	1.3E-03	09%
Pesticides/PCBs												
Aroclor-1254	3.97E-01	2.22E+00	1.80E-05	1.00E-02	7.2E-09	<1%	1.2E-09	<1%	1.3E-02	14%	2.0E-03	14%
Dieldrin	1.81E-02	3.20E+01	2.50E-05	1.00E-02	4.7E-09	<1%	7.6E-10	<1%	4.1E-04	<1%	6.6E-05	<1%
Metals												
Arsenic	1.24E+01	1.88E+00	2.40E-04	1.00E-03	1.9E-08	<1%	3.0E-09	<1%	2.9E-03	03%	4.7E-04	03%
Barium	1.06E+02	--	3.50E-03	1.00E-03	--	--	--	--	1.7E-03	02%	2.8E-04	02%
Cadmium	2.06E+00	--	1.00E-05	1.00E-03	--	--	--	--	1.2E-02	13%	1.9E-03	13%
Chromium	3.72E+01	--	1.00E-04	1.00E-03	--	--	--	--	2.1E-02	23%	3.4E-03	23%
Lead	1.26E+02	--	--	1.00E-03	--	--	--	--	--	--	--	--
Mercury	6.94E-01	--	3.00E-06	1.00E-03	--	--	--	--	1.3E-02	14%	2.1E-03	14%
				PATHWAY SUMS:	**2.E-05**	**99%**	**3.E-06**	**99%**	**9.E-02**	**99%**	**1.E-02**	**99%**

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen, calculated as 70 years (average lifetime) times 365 days per year.
3. Averaging time, noncarcinogen, calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg).
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless) / (Reference Dose, mg/kg-day).

TABLE C.3.3
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - INHALATION OF RESUSPENDED SOIL PARTICULATE CONTAMINANTS (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)	Construction Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365

INTAKE FACTOR CALCULATIONS (5)

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values(7) IUR (m^3/µg)	RfC (mg/m^3)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles											
Benzene	2.48E+00	8.30E-06	6.00E-03	1.4E-13	<1%	1.3E-13	<1%	1.9E-07	<1%	1.8E-07	<1%
Semivolatiles											
Carbazole	1.66E+01	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	1.64E+01	--	--	--	--	--	--	--	--	--	--
Semivolatiles-PAHs											
2-Methylnaphthalene	1.05E+02	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.67E+01	--	--	--	--	--	--	--	--	--	--
Anthracene	9.54E+01	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1.12E+02	8.80E-05	--	6.6E-11	02%	6.2E-11	02%	--	--	--	--
Benzo(a)pyrene	9.94E+01	8.80E-04	--	5.8E-10	14%	5.5E-10	14%	--	--	--	--
Benzo(b)fluoranthene	1.11E+02	8.80E-05	--	6.5E-11	02%	6.1E-11	02%	--	--	--	--
Benzo(g,h,i)perylene	4.33E+01	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	5.39E+01	8.80E-06	--	3.2E-12	<1%	3.0E-12	<1%	--	--	--	--
Chrysene	1.28E+02	8.80E-07	--	7.5E-13	<1%	7.0E-13	<1%	--	--	--	--
Dibenz(a,h)anthracene	1.44E+01	8.80E-04	--	8.5E-11	02%	7.9E-11	02%	--	--	--	--
Fluoranthene	2.66E+02	--	--	--	--	--	--	--	--	--	--
Fluorene	6.12E+01	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.35E+01	8.80E-05	--	2.6E-11	<1%	2.4E-11	<1%	--	--	--	--
Naphthalene	1.78E+02	--	--	--	--	--	--	--	--	--	--
Phenanthrene	3.19E+02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.15E+02	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs											
Aroclor-1254	3.97E-01	1.00E-04	--	2.6E-13	<1%	2.5E-13	<1%	--	--	--	--
Dieldrin	1.81E-02	4.60E-03	--	5.6E-13	<1%	5.2E-13	<1%	--	--	--	--
Metals											
Arsenic	1.24E+01	4.30E-03	--	3.6E-10	08%	3.3E-10	08%	--	--	--	--
Barium	1.06E+02	--	5.00E-04	--	--	--	--	9.9E-05	99%	9.3E-05	99%
Cadmium	2.06E+00	1.80E-03	--	2.5E-11	<1%	2.3E-11	<1%	--	--	--	--
Chromium	3.72E+01	1.20E-02	--	3.0E-09	71%	2.8E-09	71%	--	--	--	--
Lead	1.26E+02	--	--	--	--	--	--	--	--	--	--
Mercury	6.94E-01	--	3.00E-04	--	--	--	--	1.1E-06	01%	1.0E-06	01%
			PATHWAY SUMS:	4E-09	99%	4E-09	99%	1E-04	100%	9E-05	100%

Notes:

1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year. PEF = 7.33E+08
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, m^3/µg * 3500 kg-µg-day/mg-m^3) / (Particulate Emission Factor, m^3/kg), Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Particulate Emission Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day), Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

NC - Not calculable due to lack of toxicity or other chemical-specific information.

TABLE C.3.4
EXPOSURE ASSUMPTIONS AND RISK CALCULATIONS
CONSTRUCTION WORKER - INHALATION OF VOLATILE SOIL CONTAMINANTS (0 - 20 FEET)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

EXPOSURE ASSUMPTIONS: (4)

	Construction Worker RME(1)	CT(1)
Inhalation Rate (IR), m^3/hr	1.25	1.25
Exposure Time (ET), hrs/day	8	8
Exposure Frequency (EF), days/yr	250	234
Exposure Duration (ED), yrs	1	1
Body Weight (BW), kg	70	70
Avging Time, Carc(2) (ATC), days	25,550	25,550
Avging Time, Noncarc(3) (ATN), days	365	365

INTAKE FACTOR CALCULATIONS(5)

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATC)
RME CIF = 1.40E-03
CT CIF = 1.31E-03

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * ET * EF * ED) / (BW * ATN)
RME NIF = 9.78E-02
CT NIF = 9.16E-02

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Constituent	EP Conc(6) (mg/kg)	Toxicity Values (7) IUR ($m^3/\mu g$)	RfC (mg/m^3)	VF (m^3/kg)	Cancer Risk(8) RME	% of Total	CT	% of Total	Hazard Quotient(9) RME	% of Total	CT	% of Total
Volatiles												
Benzene	2.48E+00	8.30E-06	6.00E-03	2.45E+03	4.1E-08	100%	3.9E-08	100%	5.8E-02	100%	5.4E-02	100%
				PATHWAY SUMS:	4E-08	1E+00	4E-08	1E+00	6E-02	1E+00	5E-02	1E+00

Notes:
1. RME = Reasonable maximum exposure. CT = Central Tendency.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year .
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year.
4. See exposure assumption table.
5. Intake factor calculation from USEPA (1989).
6. Exposure point concentration.
7. See chemical-specific toxicity and exposure values table.
8. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Inhalation Unit Risk, $m^3/\mu g$ * 3500 kg-µg-day/mg-m^3) / (Volatilization Factor, m^3/kg).
   Includes conversion from IUR to inhalation slope factor = 3500 kg-µg-day/mg-m^3.
9. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, m^3/kg-day) / (Volatilization Factor, m^3/kg * Reference Concentration, mg/m^3 * 2/7 m^3/kg-day),
   Includes conversion from RfC to inhalation reference dose = 2/7 m^3/kg-day.

APPENDIX C.4

RESULTS OF RESIDENTIAL AND NON-RESIDENTIAL LEAD MODELS

Table C.4-1
Input/Output of IEUBK Lead Model
Hypothetical Future Residents
(0-10 ft interval)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	110.0	87.0
1-2	110.0	87.0
2-3	110.0	87.0
3-4	110.0	87.0
4-5	110.0	87.0
5-6	110.0	87.0
6-7	110.0	87.0

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.70
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	2.9	5.34	2.34
1-2:	3.1	7.38	3.70
2-3:	2.9	7.83	3.72
3-4:	2.7	7.80	3.75
4-5:	2.4	6.84	2.81
5-6:	2.1	6.83	2.54
6-7:	2.0	7.04	2.41

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.60	0.38	0.00	0.02

1-2:	2.71	0.94	0.00	0.03
2-3:	3.06	0.98	0.00	0.06
3-4:	2.97	1.01	0.00	0.07
4-5:	2.90	1.06	0.00	0.07
[illegible]-6:	3.07	1.12	0.00	0.09
[illegible]-7:	3.39	1.14	0.00	0.09

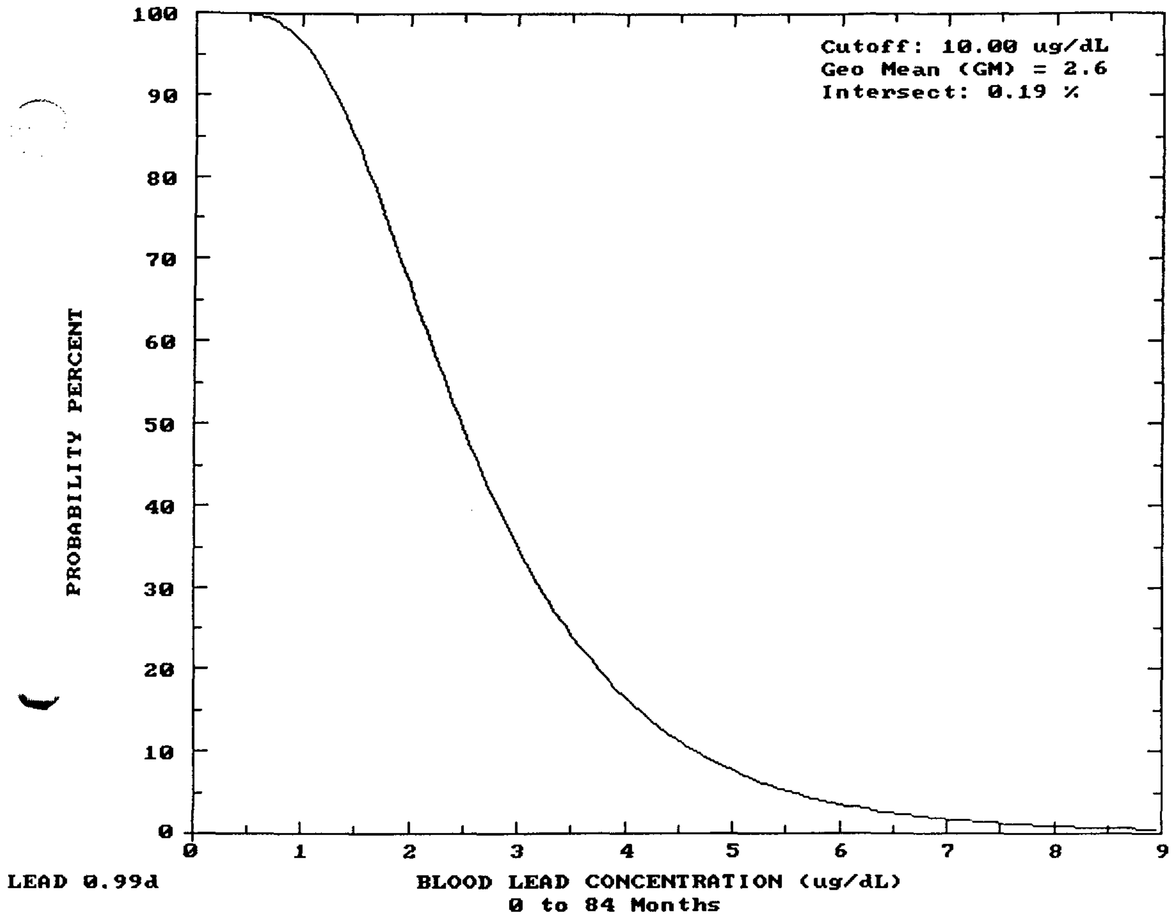


Figure C.4-1
Output of IEUBK Lead Model
Hypothetical Future Residents
(0-10 ft interval)

TABLE C.4.2
ADULT BLOOD LEAD MODEL(1)
COMMERCIAL/INDUSTRIAL WORKERS - (0-0.5 ft)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

$PbB_{adult,central} = PbB_{adult,0} + PbS*BKSF*IR_s*AF_s*EF_s/AT$ = $\boxed{2.0 \text{ ug/dL}}$

where:

$PbB_{adult,central}$ =		= Central estimate of blood lead concentrations in adults with site exposure to soil lead (ug/dL)
$PbB_{adult,0}$ =	2	= Typical blood lead concentration in adults in the absence of exposure (ug/dL)
PbS =	157	= Soil lead concentration - average - (ug/g)
BKSF=	0.4	= Biokinetic slope factor relating increase in tupical adult blood lead concentration to average daily lead uptake (ug/dL//ug/day)
IR_s =	0.1	= Intake rate of soil, including both outdoor soil and indoor soil-derived dust (g/day)
AF_s =	0.12	= Absolute gastrointestinal abosprition fraction for ingested lead in soil and dust
EF_s =	250	= Exposure frequency for contact with assessed soils and/or dust (days/year)
AT =	9125	= Averaging time: the total period during which soil contact may occur: 365 days per year for continuing exposure

$PbB_{fetal,0.95} = PbB_{adult,central}*(GSD_{i,adult})^{1.645}*R_{fetal/maternal}$ = $\boxed{6.2 \text{ ug/dL}}$

where:

$PbB_{fetal,0.95}$ =		= Goal for 95th percentile blood lead concentration among fetuses born to exposed women (ug/dL)
$SD_{i,adult}$ =	2.1	= Estimated value of the individual geometric standard deviation
$R_{fetal/maternal}$ =	0.9	= Constant of proportionality between fetal blood lead concentration at birth and maternal blood concentration

(1) USEPA, 1996

TABLE C.4.3
ADULT BLOOD LEAD MODEL(1)
COMMERCIAL/INDUSTRIAL WORKERS - (0-10 ft)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

$PbB_{adult,central}$ = $PbB_{adult,0} + PbS*BKSF*IR_s*AF_s*EF_s/AT$ = $\boxed{2.0\ ug/dL}$

where:

$PbB_{adult,central}$ =		= Central estimate of blood lead concentrations in adults with site exposure to soil lead (ug/dL)
$PbB_{adult,0}$ =	2	= Typical blood lead concentration in adults in the absence of exposure (ug/dL)
PbS =	110	= Soil lead concentration - average - (ug/g)
BKSF=	0.4	= Biokinetic slope factor relating increase in tupical adult blood lead concentration to average daily lead uptake (ug/dL//ug/day)
IR_s =	0.1	= Intake rate of soil, including both outdoor soil and indoor soil-derived dust (g/day)
AF_s =	0.12	= Absolute gastrointestinal abosprition fraction for ingested lead in soil and dust
EF_s =	250	= Exposure frequency for contact with assessed soils and/or dust (days/year)
AT =	9125	= Averaging time: the total period during which soil contact may occur: 365 days per year for continuing exposure

$PbB_{fetal,0.95}$ = $PbB_{adult,central}*(GSD_{i,adult})^{1.645}*R_{fetal/maternal}$ = $\boxed{6.1\ ug/dL}$

where:

$PbB_{fetal,0.95}$ =		= Goal for 95th percentile blood lead concentration among fetuses born to exposed women (ug/dL)
$SD_{i,adult}$ =	2.1	= Estimated value of the individual geometric standard deviation
$R_{fetal/maternal}$ =	0.9	= Constant of proportionality between fetal blood lead concentration at birth and maternal blood concentration

(1) USEPA, 1996

APPENDIX D

RISK EVALUATION USING
MAXIMUM DETECTED CONCENTRATION AS THE
EXPOSURE POINT CONCENTRATION

APPENDIX D
RISK EVALUATION USING MAXIMUM DETECTED CONCENTRATION AS THE EXPOSURE POINT CONCENTRATION

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

DERIVED CARCINOGENIC RISK FOR THE 0-10 FT INTERVAL (MDC METHOD)

Table D.1 presents the carcinogenic risks derived for receptors exposed to chemical constituents in soil in the 0-10 ft interval at the Site. These receptors were evaluated using the MDC method to determine the risk associated with the hypothetical worst-case exposure at the Site (see Subsection 3.2.3). The total receptor risk for the RME exposure scenario ranged from 1×10^{-3} for the future construction worker and future adolescent trespasser to 4×10^{-2} for the future resident (combined child and adult). The derived cancer risks for all of the receptors evaluated for the 0-10 ft interval exceeded the target risk of 1×10^{-4}. This evaluation was performed using the MDC, however, which is extremely conservative and overestimates the risk associated with exposure to chemical constituents in soil at the Site.

The COCs associated with the derived risk for the 0-10 ft interval (MDC method) are presented on Table D.2. The primary COCs identified from the risk assessment are carcinogenic PAHs. The risk was derived primarily from ingestion and dermal contact with the PAHs in soil. In addition, arsenic, Aroclor-1254, carbazole, and dieldrin were identified as COCs following ingestion or dermal contact with soil. Benzene was identified as a COC following inhalation of volatiles generated from soil and chromium was identified as a COC following inhalation of particulates generated from soil.

DERIVED NONCARCINOGENIC RISK FOR THE 0-10 FT INTERVAL (MDC METHOD)

Table D.1 presents the noncarcinogenic hazard indices derived for receptors exposed to chemical constituents in soil in the 0-10 ft interval at the Site. These receptors were evaluated using the MDC method (see Subsection 3.4.3). The total receptor hazard indices for the RME exposure scenario ranged from 0.6 for the future adolescent trespasser to 30 for the future resident (combined child and adult). The derived hazard index exceeded the target of 1 for all of the receptors, except the future adolescent trespasser. This evaluation was performed using the MDC, however, which is extremely conservative and overestimates the risk associated with exposure to chemical constituents in soil at the Site.

The COCs associated with the derived hazard indices for the 0-10 ft soil interval (MDC used as EPC) are presented on Table D.2. The primary COCs identified from the risk assessment are noncarcinogenic PAHs (acenaphthene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, pyrene), several metals (arsenic, barium, cadmium, chromium), Aroclor-1254, and benzene. In addition, benzene was identified as a COC following inhalation of volatiles generated from soil.

The exposure point concentration (95% UCL method) and the MDC are presented on Table D.3 to provide a reference point for the RGO values.

TABLE D.1
MEDIA RISK SUMMARY BY RECEPTOR
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
MAXIMUM DETECTED CONCENTRATION (1)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Future Receptor/Exposure Route	Cancer Risk		Noncarcinogenic Hazard Quotient	
	RME(2)	CT(3)	RME(2)	CT(3)
Adolescent Trespasser				
Ingestion	5E-04	1E-04	2E-01	5E-02
Dermal Contact	9E-04	7E-05	3E-01	2E-02
Inhalation of Particulates	5E-08	1E-08	2E-04	5E-05
Inhalation of Volatiles	1E-06	2E-07	1E-01	3E-02
Receptor Total	1E-03	2E-04	6E-01	1E-01
Future Industrial Worker				
Ingestion	4E-03	4E-04	6E-01	3E-01
Dermal Contact	1E-02	3E-04	1E+00	2E-01
Inhalation of Particulates	1E-06	2E-07	2E-03	2E-03
Inhalation of Volatiles	2E-05	4E-06	1E+00	1E+00
Receptor Total	1E-02	7E-04	3E+00	2E+00
Future ConstructionWorker				
Ingestion (mixed soils)	8E-04	2E-04	3E+00	6E-01
Dermal Contact (mixed soils)	4E-04	6E-05	1E+00	2E-01
Inhalation of Particulates	5E-08	5E-08	2E-03	2E-03
Inhalation of Volatiles	9E-07	9E-07	1E+00	1E+00
Receptor Total	1E-03	2E-04	6E+00	2E+00
HYPOTHETICAL RESIDENT:				
Hypothetical Resident - Adult				
Ingestion	6E-03	6E-04	9E-01	3E-01
Dermal Contact	1E-02	5E-04	2E+00	2E-01
Inhalation of Particulates	3E-06	7E-07	6E-03	4E-03
Inhalation of Volatiles	6E-05	1E-05	4E+00	3E+00
Adult Total	2E-02	1E-03	6E+00	3E+00
Hypothetical Resident - Child				
Ingestion	1E-02	2E-03	8E+00	3E+00
Dermal Contact	6E-03	2E-04	3E+00	4E-01
Inhalation of Particulates	3E-06	7E-07	2E-02	1E-02
Inhalation of Volatiles	6E-05	1E-05	1E+01	9E+00
Child Total	2E-02	2E-03	2E+01	1E+01
TOTAL FOR RESIDENT:	4E-02	3E-03	3E+01	2E+01
HYPOTHETICAL RECREATOR:				
Hypothetical Recreator - Adult				
Ingestion	2E-03	1E-04	2E-01	6E-02
Dermal Contact	4E-03	9E-05	5E-01	4E-02
Inhalation of Particulates	2E-07	1E-08	3E-04	7E-05
Inhalation of Volatiles	3E-06	2E-07	2E-01	4E-02
Adult Total	5E-03	2E-04	9E-01	2E-01
Hypothetical Recreator - Child				
Ingestion	4E-03	3E-04	2E+00	6E-01
Dermal Contact	2E-03	5E-05	9E-01	8E-02
Inhalation of Particulates	1E-07	1E-08	1E-03	2E-04
Inhalation of Volatiles	3E-06	2E-07	6E-01	2E-01
Receptor Total	5E-03	4E-04	4E+00	8E-01
TOTAL FOR RECREATOR:	1E-02	6E-04	5E+00	1E+00

Note:
1. The maximum detected concentration is used as the exposure point concentration.
2. RME - reasonable maximum exposure.
3. CT - central tendency
NC - not calculable due to lack of toxicity data for COPC.

TABLE D.2

CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA [1]
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION
AS MAXIMUM DETECTED VALUE (MDC METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	RME Cancer Risk	RME HQ
HYPOTHETICAL FUTURE TRESPASSERS				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzo(a)anthracene	4.44E-05	NA
		Benzo(a)pyrene	3.81E-04	NA
		Benzo(b)fluoranthene	4.13E-05	NA
		Benzo(k)flouranthene	2.22E-06	NA
		Dibenz(a,h)anthracene	3.33E-05	NA
		Indeno(1,2,3-c,d)pyrene	1.43E-05	NA
		Arsenic	2.82E-06	NA
	Dermal Contact	Benzo(a)anthracene	7.82E-05	NA
		Benzo(a)pyrene	6.70E-04	NA
		Benzo(b)fluoranthene	7.26E-05	NA
		Benzo(k)flouranthene	3.91E-06	NA
		Chrysene	1.09E-06	NA
		Dibenz(a,h)anthracene	5.87E-05	NA
		Indeno(1,2,3-c,d)pyrene	2.51E-05	NA
	Inhalation of VOCs	Benzene	NA	1.37E-01
HYPOTHETICAL FUTURE COMMERCIAL/INDUSTRIAL WORKER				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzo(a)anthracene	3.57E-04	NA
		Benzo(a)pyrene	3.06E-03	NA
		Benzo(b)fluoranthene	3.32E-04	NA
		Benzo(k)fluoranthene	1.79E-05	NA
		Chrysene	4.97E-06	NA
		Dibenz(a,h)anthracene	2.68E-04	NA
		Indeno(1,2,3-c,d)pyrene	1.15E-04	NA
		Aroclor-1254	1.54E-06	1.4E-01
		Arsenic	2.26E-05	NA
	Dermal Contact	Carbazole	1.78E-06	NA
		Benzo(a)anthracene	8.29E-04	NA
		Benzo(a)pyrene	7.10E-03	NA
		Benzo(b)fluoranthene	7.69E-04	NA
		Benzo(k)fluoranthene	4.14E-05	NA
		Chrysene	1.15E-05	NA
		Dibenz(a,h)anthracene	6.21E-04	NA
		Fluoranthene	NA	1.90E-01
		Indeno(1,2,3-c,d)pyrene	2.66E-04	NA
		Pyrene	NA	1.97E-01
		Aroclor-1254	1.98E-06	1.39E-01
		Arsenic	3.28E-06	NA
		Cadmium	NA	2.07E-01
		Chromium	NA	2.09E-01
	Inhalation of VOCs	Benzene	2.37E-05	1.33E+00

TABLE D.2

CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA [1]
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION
AS MAXIMUM DETECTED VALUE (MDC METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	RME Cancer Risk	RME HQ
HYPOTHETICAL FUTURE CONSTRUCTION WORKER				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	2-Methylnaphthalene	NA	2.1E-01
		Benzo(a)anthracene	6.86E-05	NA
		Benzo(a)pyrene	5.88E-04	NA
		Benzo(b)fluoranthene	6.37E-05	NA
		Benzo(k)flouranthene	3.43E-06	NA
		Dibenz(a,h)anthracene	5.14E-05	NA
		Fluoranthene	NA	3.9E-01
		Indeno(1,2,3-c,d)pyrene	2.20E-05	NA
		Naphthalene	NA	1.7E-01
		Pyrene	NA	4.1E-01
		Aroclor-1254	NA	5.2E-01
		Arsenic	4.35E-06	6.8E-01
		Cadmium	NA	1.7E-01
		Chromium	NA	1.7E-01
	Dermal Contact	Benzo(a)anthracene	3.31E-05	NA
		Benzo(a)pyrene	2.84E-04	NA
		Benzo(b)fluoranthene	3.08E-05	NA
		Benzo(k)flouranthene	1.66E-06	NA
		Dibenz(a,h)anthracene	2.49E-05	NA
		Flouranthene	NA	1.9E-01
		Indeno(1,2,3-c,d)pyrene	1.07E-05	NA
		Pyrene	NA	2.0E-01
		Aroclor-1254	NA	1.4E-01
		Cadmium	NA	2.1E-01
		Chromium	NA	2.1E-01
	Inhalation of VOCs	Benzene	9.46E-07	1.3E+00
HYPOTHETICAL RESIDENTS: ADULT				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Carbazole	1.03E-06	NA
		Benzo(a)anthracene	4.80E-04	NA
		Benzo(a)pyrene	4.11E-03	NA
		Benzo(b)fluoranthene	4.46E-04	NA
		Benzo(k)fluoranthene	2.40E-05	NA
		Chrysene	6.69E-06	NA
		Dibenz(a,h)anthracene	3.60E-04	NA
		Fluoranthene	NA	1.1E-01
		Indeno(1,2,3-c,d)pyrene	1.54E-04	NA
		Pyrene	NA	1.2E-01
		Aroclor-1254	2.07E-06	1.5E-01
		Arsenic	3.04E-05	2.0E-01

TABLE D.2

CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA (1)
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION
AS MAXIMUM DETECTED VALUE (MDC METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	RME Cancer Risk	RME HQ
HYPOTHETICAL RESIDENTS: ADULT (CONTINUED)				
Mixed Surface and Subsurface Soil (0-10 ft)	Dermal Contact	Carbazole	2.40E-06	NA
		2-Methylnaphthalene	NA	1.4E-01
		Benzo(a)anthracene	1.11E-03	NA
		Benzo(a)pyrene	9.55E-03	NA
		Benzo(b)fluoranthene	1.03E-03	NA
		Benzo(k)fluoranthene	5.57E-05	NA
		Chrysene	1.55E-05	NA
		Dibenz(a,h)anthracene	8.35E-04	NA
		Fluoranthene	NA	2.7E-01
		Indeno(1,2,3-c,d)pyrene	3.58E-04	NA
		Naphthalene	NA	1.2E-01
		Pyrene	NA	2.8E-01
		Aroclor-1254	2.66E-06	1.9E-01
		Dieldrin	1.22E-06	NA
		Arsenic	4.41E-06	NA
		Cadmium	NA	2.9E-01
		Chromium	NA	2.9E-01
	Inhalation of Particulates	Chromium	1.98E-06	NA
	Inhalation of VOCs	Benzene	6.33E-05	3.7E+00
HYPOTHETICAL RESIDENTS: CHILD				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzene	NA	1.2E-01
		Carbazole	2.41E-06	NA
		2-Methylnaphthalene	NA	5.6E-01
		Acenaphthene	NA	1.9E-01
		Benzo(a)anthracene	1.12E-03	NA
		Benzo(a)pyrene	9.55E-03	NA
		Benzo(b)fluoranthene	1.04E-03	NA
		Benzo(k)fluoranthene	5.60E-05	NA
		Chrysene	1.56E-05	NA
		Dibenz(a,h)anthracene	8.40E-04	NA
		Fluoranthene	NA	1.1E+00
		Fluorene	NA	1.6E-01
		Indeno(1,2,3-c,d)pyrene	3.60E-04	NA
		Napthalene	NA	4.6E-01
		Pyrene	NA	1.1E+00
		Aroclor-1254	4.82E-06	1.4E+00
		Dieldrin	1.23E-06	NA
		Arsenic	7.10E-05	1.8E+00
		Barium	NA	2.0E-01
		Cadmium	NA	4.7E-01
		Chromium	NA	4.7E-01
	Dermal Contact	Carbazole	1.11E-06	NA
		2-Methylnaphthalene	NA	2.6E-01
		Benzo(a)anthracene	5.15E-04	NA
		Benzo(a)pyrene	4.42E-03	NA
		Benzo(b)fluoranthene	4.78E-04	NA
		Benzo(k)fluoranthene	2.58E-05	NA
		Chrysene	7.18E-06	NA

TABLE D.2

CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA (1)
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION
AS MAXIMUM DETECTED VALUE (MDC METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	RME Cancer Risk	RME HQ
HYPOTHETICAL RESIDENTS: CHILD (CONTINUED)				
Mixed Surface and Subsurface Soil (0-10 ft)	Dermal Contact	Dibenz(a,h)anthracene	3.86E-04	NA
		Fluoranthene	NA	4.9E-01
		Indeno(1,2,3-c,d)pyrene	1.66E-04	NA
		Naphthalene	NA	2.1E-01
		Pyrene	NA	5.1E-01
		Aroclor-1254	1.23E-06	3.6E-01
		Arsenic	2.04E-06	NA
		Cadmium	NA	5.4E-01
		Chromium	NA	5.4E-01
	Inhalation of Particulates	Chromium	1.74E-06	NA
	Inhalation of VOCs	Benzene	5.56E-05	1.3E+01
HYPOTHETICAL RECREATORS: ADULT				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	Benzo(a)anthracene	1.37E-04	NA
		Benzo(a)pyrene	1.18E-03	NA
		Benzo(b)fluoranthene	1.27E-04	NA
		Benzo(k)fluoranthene	6.86E-06	NA
		Chrysene	1.91E-06	NA
		Dibenz(a,h)anthracene	1.03E-04	NA
		Indeno(1,2,3-c,d)pyrene	4.41E-05	NA
		Arsenic	8.70E-06	NA
	Dermal Contact	Benzo(a)anthracene	3.18E-04	NA
		Benzo(a)pyrene	2.73E-03	NA
		Benzo(b)fluoranthene	2.95E-04	NA
		Benzo(k)fluoranthene	1.59E-05	NA
		Chrysene	4.43E-06	NA
		Dibenz(a,h)anthracene	2.39E-04	NA
		Indeno(1,2,3-c,d)pyrene	1.02E-04	NA
		Arsenic	1.26E-06	NA
	Inhalation of VOCs	Benzene	3.02E-06	1.8E-01
HYPOTHETICAL RECREATORS: CHILD				
Mixed Surface and Subsurface Soil (0-10 ft)	Ingestion	2-Methylnaphthalene	NA	1.6E-01
		Benzo(a)anthracene	3.20E-04	NA
		Benzo(a)pyrene	2.74E-03	NA
		Benzo(b)fluoranthene	2.97E-04	NA
		Benzo(k)fluoranthene	1.60E-05	NA
		Chrysene	4.46E-06	NA
		Dibenz(a,h)anthracene	2.40E-04	NA
		Fluoranthene	NA	3.1E-01
		Indeno(1,2,3-c,d)pyrene	1.03E-04	NA
		Naphthalene	NA	1.3E-01
		Pyrene	NA	3.2E-01
		Aroclor-1254	1.38E-06	4.0E-01
		Arsenic	2.03E-05	5.3E-01
		Cadmium	NA	1.3E-01
		Chromium	NA	1.3E-01

TABLE D.2

CHEMICALS OF CONCERN IN ENVIRONMENTAL MEDIA (1)
MIXED SURFACE AND SUBSURFACE SOIL (0 - 10 FEET)
EVALUATION OF EXPOSURE POINT CONCENTRATION AS MAXIMUM DETECTED VALUE (MDC METHOD)

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Receptor/Media	Pathway	Chemical	RME Cancer Risk	RME HQ
HYPOTHETICAL RECREATORS: CHILD (CONTINUED)				
Mixed Surface and Subsurface Soil (0-10 ft)	Dermal Contact	Benzo(a)anthracene	1.47E-04	NA
		Benzo(a)pyrene	1.26E-03	NA
		Benzo(b)fluoranthene	1.37E-04	NA
		Benzo(k)fluoranthene	7.36E-06	NA
		Chrysene	2.05E-06	NA
		Dibenz(a,h)anthracene	1.10E-04	NA
		Fluoranthene	NA	1.4E-01
		Indeno(1,2,3-c,d)pyrene	4.73E-05	NA
		Pyrene	NA	1.5E-01
		Aroclor-1254	NA	1.0E-01
		Arsenic	NA	NA
		Cadmium	NA	1.5E-01
		Chromium	NA	1.6E-01
	Inhalation of VOCs	Benzene	2.65E-06	6.2E-01

(1) Chemicals of Concern are defined as those chemicals that contribute significantly to a total receptor Hazard Index (HI) greater than 1 or a cancer risk greater than 1×10^{-4}.
Significant contributions are defined as chemicals with a Hazard Quotient (HQ) greater than 0.1 or a cancer risk greater than 1×10^{-6}.

TABLE D.3
HUMAN HEALTH REMEDIAL GOAL OPTIONS (RGOs) BY RECEPTOR WITH MDC

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Medium and Receptor	Constituent of Concern	Exposure Point Concentration[1]	Maximum Detected Concentration	Concentration at Target Cancer Risk (ppm)			Concentration at Target Hazard Quotient (ppm)[2]		
				1.00E-04	1.00E-05	1.00E-06	3	1	0.1
SUBSURFACE SOIL[3,4]									
Future On-Site Trespasser	Benzo(a)anthracene	1.30E+02	2.80E+03	2.28E+03	2.28E+02	2.28E+01	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	2.28E+02	2.28E+01	2.28E+00	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	2.28E+03	2.28E+02	2.28E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	2.28E+02	2.28E+01	2.28E+00	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	2.28E+03	2.28E+02	2.28E+01	NC	NC	NC
Future Commercial/ Industrial Worker	Benzo(a)anthracene	1.30E+02	2.80E+03	2.36E+02	2.36E+01	2.36E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	2.36E+01	2.36E+00	2.36E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	2.36E+02	2.36E+01	2.36E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	1.40E+03	2.36E+03	2.36E+02	2.36E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	2.36E+01	2.36E+00	2.36E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	2.36E+02	2.36E+01	2.36E+00	NC	NC	NC
	Arsenic	1.15E+01	8.64E+01	3.32E+02	3.32E+01	3.32E+00	1.84E+03	6.13E+02	6.13E+01
Future Construction Worker	Benzo(a)anthracene	1.30E+02	2.80E+03	2.75E+03	2.75E+02	2.75E+01	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	2.75E+02	2.75E+01	2.75E+00	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	2.75E+03	2.75E+02	2.75E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	2.75E+02	2.75E+01	2.75E+00	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	2.75E+03	2.75E+02	2.75E+01	NC	NC	NC
Future Resident: Adult	Benzo(a)anthracene	1.30E+02	2.80E+03	1.76E+02	1.76E+01	1.76E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	1.76E+01	1.76E+00	1.76E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	1.76E+02	1.76E+01	1.76E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	1.40E+03	1.76E+03	1.76E+02	1.76E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	1.76E+01	1.76E+00	1.76E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	1.76E+02	1.76E+01	1.76E+00	NC	NC	NC
	Arsenic	1.15E+01	8.64E+01	2.47E+02	2.47E+01	2.47E+00	1.31E+03	4.38E+02	4.38E+01
	Benzene	2.01E+00	5.70E+01	8.88E+01	8.88E+00	8.88E-01	1.31E+04	4.38E+03	4.38E+02

TABLE D.3
HUMAN HEALTH REMEDIAL GOAL OPTIONS (RGOs) BY RECEPTOR WITH MDC

MAIN SITE RISK ASSESSMENT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

Medium and Receptor	Constituent of Concern	Exposure Point Concentration(1)	Maximum Detected Concentration	Concentration at Target Cancer Risk (ppm)			Concentration at Target Hazard Quotient (ppm) (2)		
				1.00E-04	1.00E-05	1.00E-06	3	1	0.1
SUBSURFACE SOIL (3,4)									
Future Resident: Child	Benzo(a)anthracene	1.30E+02	2.80E+03	1.71E+02	1.71E+01	1.71E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	1.71E+01	1.71E+00	1.71E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	1.71E+02	1.71E+01	1.71E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	1.40E+03	1.71E+03	1.71E+02	1.71E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	1.71E+01	1.71E+00	1.71E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	1.71E+02	1.71E+01	1.71E+00	NC	NC	NC
	Aroclor-1254	4.36E-01	4.40E+00	7.27E+01	7.27E+00	7.27E-01	9.39E+00	3.13E+00	3.13E-01
	Arsenic	1.15E+01	8.64E+01	1.18E+02	1.18E+01	1.18E+00	1.41E+02	4.69E+01	4.69E+00
	Benzene	2.01E+00	5.70E+01	1.00E+02	1.00E+01	1.00E+00	1.41E+03	4.69E+02	4.69E+01
Future Recreator: Adult	Benzo(a)anthracene	1.30E+02	2.80E+03	6.15E+02	6.15E+01	6.15E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	6.15E+01	6.15E+00	6.15E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	6.15E+02	6.15E+01	6.15E+00	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	6.15E+01	6.15E+00	6.15E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	6.15E+02	6.15E+01	6.15E+00	NC	NC	NC
	Arsenic	1.15E+01	8.64E+01	8.67E+02	8.67E+01	8.67E+00	4.60E+03	1.53E+03	1.53E+02
Future Recreator: Child	Benzo(a)anthracene	1.30E+02	2.80E+03	5.99E+02	5.99E+01	5.99E+00	NC	NC	NC
	Benzo(a)pyrene	1.16E+02	2.40E+03	5.99E+01	5.99E+00	5.99E-01	NC	NC	NC
	Benzo(b)fluoranthene	1.26E+02	2.60E+03	5.99E+02	5.99E+01	5.99E+00	NC	NC	NC
	Benzo(k)fluoranthene	6.34E+01	1.40E+03	5.99E+03	5.99E+02	5.99E+01	NC	NC	NC
	Dibenz(a,h)anthracene	1.41E+01	2.10E+02	5.99E+01	5.99E+00	5.99E-01	NC	NC	NC
	Indeno(1,2,3-c,d)pyrene	4.95E+01	9.00E+02	5.99E+02	5.99E+01	5.99E+00	NC	NC	NC
	Arsenic	1.15E+01	8.64E+01	4.14E+02	4.14E+01	4.14E+00	4.93E+02	1.64E+02	1.64E+01

Note:
-- indicates that the analyte is not a preliminary COC for the media/receptor of concern.
NC Not calculated, no criteria or toxicity information available.
1. Exposure point concentration currently estimated for this medium
2. The RGO was derived using the following simplified equation:
RGO = EPC x target HI/derived HI
where: target HI = 1.0
derived HI = total receptor HI derived in the risk assessment (Table A 2)
3. Calculations for current trespassers include inhalation of volatiles generated from soil.
4. Calculations for hypothetical future receptors include exposure to soil via ingestion, dermal contact, and inhalation

APPENDIX E

TOXICITY PROFILES

BENZENE

CAS NUMBER

71-43-2

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 1,791 mg/L [1]
Vapor Pressure: 95.19 mm Hg at 25°C [1]
Henry's Law Constant: 5.43 x 10^{-3} atm-m^3/mole (temperature not given) [1]
Specific Gravity: 0.879 at 15/5°C [2]
Organic Carbon Partition Coefficient: 31 - 143 [1]

FATE DATA: HALF-LIVES

Soil: 5 - 16 days [3]
Air: 2.09 - 20.9 days [3]
Surface Water: 5 - 16 days [3]
Groundwater: 10 days to 2 years [3]

NATURAL SOURCES

Crude oil, volcanoes, forest fires, plants [1].

ARTIFICIAL SOURCES

Gasoline, fuel oils, chemical industry, coke ovens, mining, manufacturing, cigarette smoke [1].

FATE AND TRANSPORT

Benzene will rapidly volatilize from surface soil and water. That which does not volatilize from permeable surface and subsurface soils will be highly to very highly mobile, and can be expected to leach to nearby groundwater which is not protected by a confining layer. It is fairly soluble, and will be carried with the groundwater to discharge points. It may be subject to biodegradation in soils, shallow groundwater, and surface water. Benzene will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms, or hydrolyze. Photodegradation may be a significant removal mechanism in surface waters which are not conducive to microbial degradation. Benzene will undergo significant photodegradation in air, but may be washed out with rain [1].

HUMAN TOXICITY

General. Benzene is absorbed into the body following ingestion, inhalation, and dermal contact, and must undergo metabolic transformation to exert its toxic effects. Metabolism occurs primarily in the liver, and to a lesser extent in the bone marrow [4]. The primary targets of benzene toxicity are the central nervous system and the blood [4,5]. Benzene is genotoxic to humans and the USEPA has placed it in weight-of-evidence cancer Group A, indicating that it is a human carcinogen [6].

Oral Exposure. A chronic oral RfD for benzene is currently under review by the USEPA [6], but a provisional value has been provided. A provisional value of 0.003 mg/kg-day is based on a LOAEL of 8 mg/kg-day for hematological and immunological effects in a subchronic study in mice [7]. Benzene is readily absorbed following oral exposure. The lowest reported fatal dose in humans is 50 mg/kg [5]. Acute oral LD_{50} values in animals include 930 to 5600 mg/kg in rats, 2000 mg/kg in dogs and 4700 mg/kg in mice [4,5]. Data regarding the ingestion of benzene in humans are limited to acute overexposure. Ingestion of 2 ml (29 mg/kg) has resulted in depression of the central nervous system, while ingestion of 10 ml (143 mg/kg) has been fatal [5]. The cause of death was usually respiratory arrest, central nervous system depression or cardiac collapse [4]. In animals, longer-term oral exposure has resulted in toxic effects on the blood (cytopenia: decrease in various cellular elements of the blood) and the immunological system (decreased white blood cells) [4]. There is no evidence that oral exposure to benzene causes effects on reproduction and development, but studies in animals suggest that benzene may affect fetal development [4]. There is no information regarding carcinogenic effects in humans following oral exposure to benzene, but studies in animals indicate that benzene ingestion causes cancer in various regions of the body [4]. An oral Slope Factor of 0.029 $(mg/kg/day)^{-1}$ is based on an increase in the incidence of leukemia in occupationally-exposed workers [6]. The oral Slope Factor was extrapolated from the inhalation data.

Inhalation Exposure. A chronic inhalation RfC for benzene is currently under review by the USEPA [6], but a provisional value has been provided. A provisional value of 0.006 mg/m^3 is based on a NOAEL of 5.7 mg/m^3 for hematopoetic effects in a subchronic study in mice [8]. Benzene is readily absorbed following inhalation exposure. The lowest reported fatal concentration in humans is 6380 mg/m^3 for a 5 minute exposure [5]. Acute inhalation LC_{50} values in rats ranged from 10,000 ppm for 7 hours to 13,700 ppm for 4 hours [4,5]. Most of the available data regarding benzene exposure involve workers exposed in the workplace. The acute effects of benzene exposure involve the central nervous system. Brief exposure to concentrations of 700 to 3000 ppm can cause drowsiness, dizziness, headaches and unconsciousness, and exposure to concentrations of 10,000 to 20,000 ppm can result in death [4]. In most cases, the effects will end when exposure ceases. The hematopoietic system is the primary target of toxicity following long-term exposure: exposure for several months to years results in pancytopenia (reduction in red blood cells, platelets and white blood cells), while continued exposure for many years results in anemia or leukemia. The lowest concentration resulting in the hematological effects is approximately 10 to 50 ppm [5]. Benzene has been shown to cause chromosomal aberrations in bone marrow and lymphocytes in workers exposed to concentrations > 100 ppm [5]. Chromosomal damage has been found in animals at concentrations as low as 1 ppm [5]. Benzene is not known to be teratogenic (cause birth defects) in humans, but has been found to cause various problems in the developing fetus of animals (low birth weight, delayed bone formation) [4,5]. Occupational exposure to benzene has resulted in leukemia in exposed workers [4,5]. An inhalation Unit Risk of 8.3 x 10^{-6} $(ug/m^3)^{-1}$ is based on the incidence of leukemia in occupationally-exposed workers [6].

Dermal Exposure. Dermal exposure to benzene may cause redness and dermatitis [4,5]. Systemic effects have not been reported following dermal exposure to benzene.

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POLYCYCLIC AROMATIC HYDROCARBONS

GENERAL

Polycyclic aromatic hydrocarbons (PAHs) are a large group of chemicals formed during the incomplete combustion of organic materials. There are over one hundred PAHs, and they are found throughout the environment in air, water, and soil. Seven of the 15 PAHs addressed in this profile are classified as probable human carcinogens [1,2].

CAS NUMBERS

Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Phenanthrene	85-01-8
Benzo(g,h,i)perylene	191-24-2	Pyrene	129-00-00
Benzo(k)fluoranthene	207-08-9		

COMMON SYNONYMS

Polynuclear aromatic hydrocarbons, PNAs, PAHs.

ANALYTICAL CLASSIFICATION

Semivolatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble to 3.93 mg/L [1]
Vapor Pressure: negligible to very low at 25°C [1]
Henry's Law Constant: 6.95×10^{-8} to 1.45×10^{-3} atm-m^3/mole [1]
Specific Gravity: approximately 0.9 to 1.4 at 0 to 27°C [1]
Organic Carbon Partition Coefficient (K_{oc}): 2.5×10^3 to 5.5×10^6 [1]

FATE DATA: HALF-LIVES

Soil: 12.3 days to 5.86 years [3]
Air: 0.191 hours to 2.8 days [3]
Surface Water: 0.37 hours to 1.78 years [3]
Groundwater: 24.6 days to 10.4 years [3]

NATURAL SOURCES

Volcanoes, forest fires, crude oil, and oil shale [1].

ARTIFICIAL SOURCES

Motor vehicles and other petroleum fuel engines, wood-burning stoves and fireplaces, furnaces, cigarette smoke, industrial smoke or soot, and charcoal-broiled foods [1].

FATE AND TRANSPORT

Because the physical and chemical properties of PAHs vary substantially depending on the specific compounds in question, the fate and transport characteristics vary. Thus, the following discussion is presented in very general terms. Some fate characteristics are roughly correlated with molecular weight; so the compounds are grouped as follows [1]:

- Low molecular weight: acenaphthene, acenaphthylene, anthracene, fluorene, and phenanthrene;
- Medium molecular weight: fluoranthene and pyrene; and
- High molecular weight: benzo(a)anthracene, benzo(b)fluoranthene, benzo-(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenzo-(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

PAHs are present in the atmosphere in the gaseous phase and sorbed to particulates. They may be transported great distances, and are subject to photodegradation as well as wet or dry deposition [1].

PAHs in surface water are removed by volatilization, binding to particulates and sediments, bioaccumulation, and sorption onto aquatic biota. The low molecular weight PAHs have Henry's Law constants in the range of 10^{-3} to 10^{-5} atm-m^3/mole, and would therefore be expected to undergo significant volatilization; medium molecular weight PAHs have constants in the 10^{-6} range; and high molecular weight PAHs have constants in the range of 10^{-5} to 10^{-8}. Half-lives for volatilization of benzo(a)anthracene and benzo(a)pyrene from water have been estimated to be greater than 100 hours. It has been reported that lower molecular weight PAHs could be substantially removed by volatilization under conditions of high temperature, shallow depth, and high wind. For example, anthracene was found to have a half-life for volatilization of 18 hours in a stream with moderate current and wind. In an estuary, volatilization and adsorption are the primary removal mechanisms for medium and high molecular weight PAHs, whereas volatilization and biodegradation are the major mechanisms for low molecular weight compounds. PAHs can bioaccumulate in plants and animals, but are subject to extensive metabolism by high-trophic-level consumers, indicating that biomagnification is not significant [1].

Potential mobility in soil is related to the organic carbon partition coefficient (K_{oc}). The low molecular weight PAHs have K_{oc} values in the range of 10^3 to 10^4, which indicates a moderate potential to be adsorbed to organic material. Medium molecular weight compounds have values on the order of 10^4, while high molecular weight compounds have values in the 10^5 to 10^6 range. The latter compounds, then, have a much greater tendency to adsorb and resist movement through soil. Volatilization of the lower molecular weight compounds from soil may be substantial. However, some portion of PAHs in soil may be transported to groundwater, and then move laterally in the aquifer, depending on soil/water conditions [1].

HUMAN TOXICITY

General. Ingestion of, inhalation of, or dermal contact with PAHs by laboratory animals has been shown to produce tumors. Reports in humans show that individuals exposed by inhalation or dermal contact for long periods of time to mixtures of PAHs and other compounds can also develop cancer. However, the relationship of exposure to any individual PAH with the onset of cancer in humans is not clear [1]. The available RfDs and weight-of-evidence groups for the PAHs addressed in this profile are presented in Table 1. The available slope factors are presented below. No other toxicity values were available [2,4].

Oral Exposure. Indirect evidence suggests that benzo(a)pyrene may not be readily absorbed following oral exposure in humans. On the other hand, absorption in rats appears to be rapid and efficient. Whether or not there is actually a significant difference between humans and rats in the capacity to absorb benzo(a)pyrene is questionable. It should be noted that the degree of uptake is highly dependent on the vehicle of administration. A NOAEL of 150 mg/kg/day was determined for gastrointestinal, hepatic, and renal effects in rats following acute oral exposure to benzo(a)pyrene or benzo(a)anthracene. LOAELs in the range of 40 to 160 mg/kg/day were determined for developmental and reproductive effects in mice following acute oral exposure to benzo(a)pyrene [1]. An oral slope factor of 7.3 $(mg/kg/day)^{-1}$ for benzo(a)pyrene is based on tumors detected in the forestomachs of rats and mice in various diet studies [2].

Inhalation Exposure. The USEPA does not currently provide inhalation RfCs for any of the PAHs [2,4]. Pure PAH aerosols appear to be well absorbed from the lungs of animals. However, PAHs adsorbed to various particles appear to be poorly absorbed, if at all. The latter are most likely to be removed from the lungs by mucociliary clearance and subsequent ingestion. Lung cancer in humans has been strongly associated with long-term inhalation of coke-oven emissions, roofing-tar emissions, and cigarette smoke, all of which contain mixtures of carcinogenic PAHs. It has been estimated that

TABLE 1
SELECTED TOXICITY DATA FOR PAHS[a]

Compound	CAG Group[b]	Oral RfD (mg/kg/d)	Species	Critical Effect	Experimental Doses (mg/kg/day)	Study Type[c]
Acenaphthene	NR	0.06	Mouse	Hepatotoxicity	NOAEL: 175 LOAEL: 350	SC
Acenaphthylene	D	UR				
Anthracene	D	0.3	Mouse	None observed	NOEL: 1,000	SC
Benzo(a)anthracene	B2	NR				
Benzo(a)pyrene	B2	NR				
Benzo(b)fluoranthene	B2	NR				
Benzo(g,h,i)perylene	D	NR				
Benzo(k)fluoranthene	B2	NR				
Chrysene	B2	NR				
Dibenzo(a,h)anthracene	B2	NR				
Fluoranthene	D	0.04	Mouse	Nephropathy, increased liver wt, hematol alter	NOAEL: 125 LOAEL: 250	SC
Fluorene	D	0.04	Mouse	Decreased RBC, packed cell vol, and hemoglobin	NOAEL: 125 LOAEL: 250	SC
Indeno(1,2,3-cd)pyrene	B2	NR				
Phenanthrene	D	NR				
Pyrene	D	0.03	Mouse	Renal tubular pathology, decreased kidney weights	NOAEL: 75 LOAEL: 125	SC

a. From IRIS [2]. When IRIS values were unavailable, HEAST [4] values were used. RfD = reference dose, NR = not reported

b. CAG = USEPA Carcinogen Assessment Group. B2 = probable human carcinogen; D = not classifiable as to human carcinogenicity.

c. SC = subchronic.

the 8-hour time-weighted average exposure to PAHs in older coke plants was approximately 22 to 33 $\mu g/m^3$ [1]. An inhalation slope factor is not available for any of the PAHs [2,4].

Dermal Exposure. Limited *in vivo* evidence exists that PAHs are at least partially absorbed by human skin. An *in vitro* study with human skin indicated that 3% of an applied dose of benzo(a)pyrene was absorbed after 24 hours. Studies in mice indicated that at least 40% of an applied dose of benzo(a)pyrene was absorbed after 24 hours. The carcinogenic PAHs as a group cause various noncancerous skin disorders in humans and animals. Substances containing mixtures of PAHs have been linked to skin cancers in humans. Studies in laboratory animals have demonstrated the ability of benz(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene to induce skin tumors [1].

ECOLOGICAL TOXICITY

General. The molecular weight of the individual PAHs affects their mobility and solubility in the environment, with lower weight compounds generally being more volatile and soluble than higher weight compounds, which have strong sorption properties. In aquatic environments, PAH partitioning in sediments occurs in an equilibrium process, with a potential for localized occurrences of high levels of dissolved PAHs [5,6]. PAHs can bioaccumulate in plants and animals, but do not biomagnify in food chains. Inter- and intraspecies responses to carcinogenic PAHs are variable, and some PAHs tend to inhibit the carcinogenicity of other compounds in mammals [7]. A variety of adverse effects on aquatic and terrestrial animals has been observed.

Vegetation. Plants absorb PAHs from soils through their root systems, and can translocate them to above ground parts. Lower weight PAHs are absorbed more readily than other PAHs [7]. Airborne deposition of particulate PAHs, and the subsequent adsorption to the skins of fruits and vegetables, accounts for reported higher PAH concentrations in aboveground versus underground plant parts. Soil concentrations of benzo(a)pyrene typically may reach 1,000 mg/kg; concentrations for total PAHs typically exceed benzo(a)pyrene concentrations by at least one order of magnitude. PAH concentrations in vegetation typically range from 20 to 1,000 $\mu g/kg$ [6]. Some plants biocentrate PAHs in their oily parts (e.g., seeds) above levels in surrounding soils, but this does not appear to be typical [6]. In limited studies on PAHs in plants, phytotoxic effects were rare; photosynthetic inhibition in algae has been documented [7,6]. Some vascular plants catabolize benzo(a)pyrene [6], and PAHs synthesized by plants may act as growth hormones [7,8]. Plants may serve as a pathway for exposure of higher-order consumers to toxic levels of PAHs.

Aquatic Life. Most PAHs in aquatic environments tend to sorb to sediments, and sediment-associated PAHs have accounted for up to 77 percent of the steady-state body burden in benthic amphipods [7]. Absorption and assimilation of PAHs vary widely among species and according to the specific compound. Crustaceans and fish appear better able to assimilate, metabolize, and eliminate PAHs than do molluscs and polychaetes [7,8]. Fish appeared to detoxify benzo(a)pyrene as quickly as it was absorbed in water-only exposures [9]. Little potential for biomagnification through aquatic food chains exists, and bioconcentration factors range widely. A 2- to 3-day exposure BCF of 485 was reported for anthracene in fathead minnows, and a 24-hour BCF of 12 was reported for benzo(a)pyrene in bluegill [7].

Toxic effects of PAHs in fish include liver, thyroid, gonad, and skin tumors. Phenanthene has an LC_{50} of 370 μg/L in grass shrimp, and benz(a)anthracene has an LC_{87} of 1,000 μg/L in bluegill [7]. In the Black River, Ohio, where sediment PAH levels were 10,000 times those in a control location, brown bullheads showed elevated concentrations of lower molecular weight PAHs in their livers and a higher incidence of liver tumors [5,7,8]. Dissolved fluorene introduced into pond waters resulted in reduced growth in bluegill at 0.12 mg/L, and in increased vulnerability to predation at 1.0 mg/L [7].

There are no promulgated federal or state aquatic life water quality criteria for any of the PAHs, though the USEPA has proposed a chronic criterion of 6.3 μg/L and an acute criterion of 30 μg/L for phenanthrene in fresh waters [10,11].

Wildlife. PAH toxicity studies in animals are mostly confined to laboratory experiments. Many PAHs can produce tumors in skin and epithelia tissues in all animal species tested, with malignancies induced by microgram acute exposures. Some carcinogenic PAHs can pass across skin, lungs, intestines, and placenta in mammals. Target organs are diverse, and the tissue affected is dependent on the compound and method of exposure. For example, dietary benzo(a)pyrene caused leukemia, lung adenoma, and stomach tumors in mice. Ancillary tissue damage may accompany carcinomas [7]. Selective effects based on age and gender of the receptor have also been observed [8,12,9,13]. Mammals do not tend to accumulate PAHs, which is likely due to the rapid metabolism of these compounds. For example, the biological half-life of benzo(a)pyrene in rat blood and liver was 5 to 10 minutes [7].

There is a scarcity of data on PAHs that are not carcinogenic [14]. Many chemicals, including other PAHs, modify the carcinogenic actions of PAHs in laboratory animals. Inhibitors of PAH-induced tumors include selenium, vitamins A and E, flavones, and ascorbic acid [7]. LD_{50} values also range widely: acute oral LD_{50} values for rodents range from 50 mg/kg body weight for benzo(a)pyrene to 700 mg/kg for phenanthrene, to 2,000 mg/kg for fluoranthene. Chronic oral carcinogenicity values for rodents include 40 mg/kg for benzo(b)fluoranthene, 72 mg/kg for benzo(k)fluoranthene, and 99 mg/kg for chrysene [7].

In a study on mallards, no mortality or visible toxic effects were observed over 7 months during which birds were fed diets containing 4,000 mg/kg PAHs, though heptatic changes were observed. Sax [9] reports that single oral doses of 250 ppm benzo(a)pyrene were not acutely toxic to ducks or chickens.

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ARSENIC

CAS NUMBER

7440-38-2

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 5.727 at 25/5°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Arsenic is a naturally-occurring element. The concentration of arsenic in minimally disturbed soils varies tremendously. A collection of 1,257 soil samples from across the conterminous U.S. determined that 90 percent were less than or equal to 10 ppm, with a geometric mean of 5.2 ppm, but with a maximum value as high as 100 ppm [3].

FATE AND TRANSPORT

Elemental arsenic is extremely persistent in both water and soil. Environmental fate processes may transform one arsenic compound to another; however, arsenic itself is not degraded. Soluble forms of arsenic tend to be quite mobile in water, while less soluble species adsorb to clay or soil particles. Microorganisms in soils, sediments, and water can reduce and methylate arsenic to yield methyl arsines, which volatilize and enter the atmosphere. These forms then undergo oxidation to become methyl arsonic acids and are ultimately transformed back to inorganic arsenic [1].

Bioconcentration of arsenic occurs in aquatic organisms, primarily in algae and lower invertebrates. Biomagnification in aquatic food chains does not appear to be significant, although some fish and invertebrates contain high levels of arsenic compounds which are relatively inert toxicologically. Plants may accumulate arsenic, subject to various factors including soil arsenic concentration, plant type, and soil characteristics [1].

HUMAN TOXICITY

General. Arsenic is a long-recognized human poison capable of producing a lethal reaction and cancer. The major targets of arsenic toxicity are the respiratory system, gastrointestinal system, nervous system, hematological system and skin [1]. Studies in animals suggest that low levels of arsenic may be necessary to maintain good health, but this has not been shown in humans [1]. Arsenic is considered a weak mutagen and has been placed in weight-of-evidence cancer Group A, indicating that it is a human carcinogen [4].

Oral Exposure. A chronic oral RfD of 0.0003 mg As/kg/day is based on a NOAEL of 0.0008 mg As/kg/day for hyperpigmentation, keratosis and possible vascular complications in a chronic oral study in humans [4]. Arsenic is readily absorbed following oral exposure. Acute oral LD_{50} values of 26 mg/kg for mice and 15 to 110 mg/kg for rats are reported [1]. The fatal dose in humans is estimated to be 2 mg/kg [1]. Low-level oral exposure (> 0.01 mg As/kg/day) may cause irritation of the digestive tract, pain, nausea, vomiting, diarrhea, skin abnormalities, decreased production of blood cells, abnormal heart function, blood-vessel damage, liver damage, kidney damage, and impaired nerve function ("pins and needles" sensation). In animal studies, high doses of arsenic (> 14 mg As/kg/day) have resulted in effects on the developing fetus. These effects have not been observed in humans [1]. In humans, chronic, oral exposure to low doses of arsenic (> 0.01 mg As/kg/day) has been shown to cause cancer of the skin, liver, bladder, and lung. The most characteristic effect of long-term oral exposure to arsenic is a darkening of the torso and the appearance of small "corns" or "warts" on the palms, soles and torso. These "corns" or "warts" may develop into skin cancer [1]. An oral slope factor of 1.5 $(mg/kg/day)^{-1}$ has been adopted by the USEPA [4]. The slope factor is based on the increased incidence of skin cancer in humans exposed to arsenic in the drinking water.

Inhalation Exposure. An inhalation RfC is not available for inorganic arsenic [4]. Approximately 40% of an inhaled concentration of arsenic is absorbed [1]. Inhalation of arsenic has not been reported to be fatal in humans, and acute inhalation LC_{50} values are not available [1]. Inhalation of arsenic at concentrations greater than 0.1 mg As/m^3 may result in irritation of the nose and throat, leading to laryngitis, bronchitis or rhinitis [1]. Effects on the skin, nervous system, and gastrointestinal system similar to those found following oral exposure have been observed in humans following inhalation exposure. Of much greater concern, however, is that inhaled arsenic has been found to increase the risk of lung cancer in humans [1]. An inhalation Unit Risk of 0.0043 $(ug\ As/m^3)^{-1}$ was derived by USEPA [4] based on the increased incidence of lung cancer in occupationally exposed workers. Several epidemiology studies have suggested an association between arsenic inhalation and an increased risk of developmental effects (congenital malformations, low birth weight, spontaneous abortion) [1]. Studies in animals support the view that arsenic is a developmental toxicant, but only at high doses (20 mg/m^3) [1].

Dermal Exposure. Arsenic has not been reported to be fatal following dermal contact [1]. Dermal contact with arsenic may result in mild to severe irritation of the skin and mucous membranes and could lead to dermal sensitization [1].

ECOLOGICAL TOXICITY

General. Arsenic is a relatively common element that is present in air, water, soil, plants, and all living tissues. At comparatively low doses, arsenic stimulates growth and development in various species of plants and animals [5]. Arsenic exists in the trivalent (III) and pentavalent (V) states, and its compounds may be either organic or inorganic [6]. Inorganic arsenic compounds are more toxic than organic compounds [5]. Background concentrations of arsenic in unpolluted river waters and soils in the United States are usually <5 μg/L and <15 mg/kg dry weight, respectively [5]. Arsenic is bioconcentrated by organisms, but does not biomagnify in the food chain.

Vegetation. There is no evidence that arsenic is essential for plant growth [7]. Elemental arsenic is considered to be relatively nontoxic to plants [8]. In plants, arsenic concentrations vary between 0.01 and 1.0 ppm. Plants grown in soils contaminated with arsenic do not show higher concentrations of this element than plants grown on uncontaminated soil [7]. In cases of arsenic toxicity, the roots are usually severely affected and plant growth is limited before large amounts of arsenic are absorbed and translocated [8]. Arsenic in soils is most toxic to plants at the seedling stage where it limits germination and reduces viability [7]. The concentration of arsenic that is toxic to plants was determined to be >10 ppm by the National Academy of Sciences [9].

Aquatic Life. Arsenic is toxic to aquatic organisms within the range of 1.0 to 45.0 mg/L arsenite, which is considered more toxic than arsenate [8]. Arsenic is extremely mobile in the aquatic environment, and its fate depends largely on prevailing pH and Eh conditions [10]. Normal arsenic concentrations in fish are 0.52 ppm for bluegill and 0.14 to 1.95 ppm for minnows [9].

Arsenic can bioaccumulate in aquatic vertebrates and invertebrates from water and food, but concentration factors are relatively low [5,11]. The BCF of inorganic arsenic in most invertebrates and fish exposed for 21 to 30 days did not exceed 17 [5]. The biological half-lives of arsenic in green sunfish and bluegills are 7 days and 1 day, respectively [11]. The lethal threshold of arsenic for minnows has been reported to be 234 mg/L [6]. Micromedex, Inc. [12] reported the 36-hour toxic value for minnows was 11.6 ppm and the 16-hour toxic value was 60 ppm.

The USEPA acute freshwater criterion for arsenic (V) is 850 μg/L and because there is insufficient data to develop the criteria, the value presented is the LOEL. The acute freshwater criterion for arsenic (III) is 360 μg/L, and the chronic freshwater criterion for the trivalent form is 190 μg/L [13]. The Ohio chronic aquatic life water quality criterion for arsenic is 190 μg/L based on warmwater and modified warmwater habitats [14].

Wildlife. Chronic poisoning is infrequently seen in most animals because detoxication and excretion are rapid [5]. Normal arsenic concentrations in mice are 1.0 ppm, while hawks typically have body burdens of 0.4 ppm [9]. Adverse effects were noted in mammals at single oral doses of 2.5 to 33 mg/kg body weight and at chronic oral doses of 1 to 10 mg/kg body weight [5]. Acute waterfowl toxicity is reported at 0.05 ppm [12]. Median lethal concentrations in the diets of mallards were reported at 5,000 ppm [15]. The oral LD_{50} values are 15 mg/kg body weight for rats, 25 to 47 mg/kg body weight for mice, 4 to 19 mg/kg body weight for rabbits, and 6.5 mg/kg body weight for fowl [12]. Arsenic does not accumulate in mammals [8].

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